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Islamic Republic of Mauritania Fisheries Sector Review

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Africa Region
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Industry and Energy Division

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Currency Equivalents
Currency Unit: Ouguiya (UM)

Average Exchange Rate (UM/\$)
1991 US\$1 UM81.83
1992 US\$1 UM84.79

Acronyms and Abbreviations

ALMAP	Société Algéro-Mauritanienne des Pêche (Joint Venture Fishing Company)
BCM	Banque Centrale de Mauritanie
CCA	Consultative Inspection Board
CECAF	Fishery Committee for the Eastern Central Atlantic of FAO
CFPM	Nouadhibou's Professional Training Center
CNROP	National Center for Oceanography and Fish Research
COFI	Committee on Fisheries of the FAO
COMACOP	Compagnie Mauritano-Coréenne de Pêche (Joint Venture Fishing Company)
CUE	Catch per Unit Effort
DANIDA	Danish International Development Agency
DCP	Fisheries Control Department
DPDP	Development Plan
EC	European Community
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization
FIAP	Fisheries Industry Group (Motorized)
FIAPECHE	Fisheries Industry Group (Non-motorised)
GDP	Gross Domestic Product
GTZ	Federal Republic of Germany Aid Organization
IBRD	International Bank for Reconstruction and Development
IMF	International Monetary Fund
ITU	International Transport Union
KFW	Kreditanstalt für Wiederaufbau
MASPECO	Private Sector Fishing Company
MASHREF	Mauritano-Saudi Ship-Repair Facility
MAUSOV	Société de Pêche Mauritano-Soviétique
MPEM	Ministère des Pêche et de l'Economie Maritime
NGO	Non-Governmental Organization
ORSTOM	Institute for Scientific Research for Development and Cooperation (France)
PAN	Port Autonome de Nouadhibou
PCR	Program for Consolidation and Growth
PIP	Public Investment Program
PREF	Economic and Financial Recovery Program
SALIMAUREM	Société Arabe Libyenne-Mauritanienne (Joint Venture Fishing Company)
SIMAR	Société Industrielle Mauritano-Roumanienne de Pêche (Joint Venture Fishing Company)
SIPECO	Private Sector Fishing Company
SITAC	Private Sector Fishing Company
SMAIP	Private Sector Fishing Company
SMCP	Fishery Marketing Board
SNIM	Mauritanian Iron Ore Company
SPPAM	Company for the Promotion of Artisanal Fisheries

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ISLAMIC REPUBLIC OF MAURITANIA FISHERIES SECTOR REVIEW

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ISLAMIC REPUBLIC OF MAURITANIA

FISHERIES SECTOR REVIEW

PREFACE

1. This report is based on the findings of a mission to Mauritania in October 1991 and of follow-up discussions in December 1991. This review represents the first effort undertaken by the World Bank and the donor community, oriented to the medium- and long-term operational and strategic concerns of the fisheries sector. The review defines a program of sectoral reforms, as well as a medium and long-term-oriented strategy to foster further development of the sector. It is hoped that the framework for fisheries development described in this report will contribute to effective planning of future actions in the sector by the Government, the private sector, and the donor community.

2. The Bank mission comprised Miguel Saponara (mission leader and responsible for the report), Loup Brefort (World Bank), Mohamed Cherif (Consultant, World Bank), Andrew Palfreman (Consultant, World Bank), Ronald Moor (Consultant, Fund for European Development (FED)), Páll Gíslason (Consultant, Iceland Trust Fund), G. Ancey (Caisse Central de Cooperation Economique (CCCE)), Etienne Woitelier (CCCE), J. C. Franqueville (Ministere pour le Cooperation au Developpement, France), and M. Sham (German Overseas Development Agency (GTZ)).

3. Messrs. I. Menezes (World Bank), F. Gosetti (FED), J. C. Cueff (Commission European Economique), C. Teyseyre (CCCE), and J. P. Destouest (MCD) participated in several of the mission's discussions and made substantive contributions. Mr. E. Loayza has been the peer reviewer. L. Sprague (World Bank, Ret.) provided technical insights on fisheries resources and helped edit the report. C. Brathwaite processed the report. The sector review was carried out under the direction and guidance of Katherine Marshall, the Director of the Sahelian Department, François Laporte, Lead Economist of the Sahelian Department, Jean-Louis Sarbib, the Country Operations Division Chief, and Silvia Sagari, the Chief of the Industry and Energy Division.

4. This report was made possible by the cooperation of many officials of the Government of Mauritania, in particular those in the Ministry of Fisheries and Marine Economy, the Ministry of Planning, the Ministry of Finance, and the Central Bank. Our acknowledgments go to those in the fisheries private sector for their invaluable assistance.

ISLAMIC REPUBLIC OF MAURITANIA

FISHERIES SECTOR REVIEW

EXECUTIVE SUMMARY

Why was this Review undertaken?

1. The Government of Mauritania (GOM) regarded it as imperative that a review be conducted because of the crisis in the sector, and because events in the fisheries sector impinged on the banking sector, which was the subject of a major recapitalization and restructuring exercise from 1987-1989 under a Bank-financed Sector Adjustment Loan (SAL).
2. Fisheries activity in Mauritania grew remarkably over 1984-86 when catches¹ increased from 286,000 mt to 591,000 mt -- a compound rate of about 44 percent per annum. But in 1987 the total catch declined, estimated at 563,000 mt in 1987 and 446,000 mt in 1991. Even with this decline, Mauritania's fishing activity is one of the sub-region's largest.
3. Until recently (1988), the fisheries sector in Mauritania was a dominant source of foreign exchange and government revenue. The sector generated about US\$308 million (68 percent) of the country's total foreign exchange in 1988, falling to about US\$236 million (54 percent) in 1991. The fisheries sector also makes a vital contribution to the budget, yielding about 20 percent of total budget revenues.
4. The fisheries sector was expected to be a major source of economic growth during the 1980s and 1990s; to offer the greatest potential for increased employment and value-added; and to be a key generator of foreign exchange earnings and budget revenue.
5. Instead, the fisheries sector now finds itself in a crisis, evidenced by sharply lower catch rates caused by heavy overfishing and other problems. Its recent poor performance is therefore particularly worrisome, given the implications for: lower economic growth; diminished foreign exchange earnings; lower budget revenues with substantially increased outstanding (and probably uncollectible) debts due to the banking sector².

What are the most important fisheries resources?

6. Extremely valuable surface (pelagic), mid-water, and bottom (demersal) species of commercial fish live in Mauritanian waters. The most important are tuna, shrimp, bream, and cephalopods (octopus,

1. Catch and landing totals do not correspond: substantial quantities of fish transhipped at sea are not counted as landings.

2. Foreign exchange earnings from the fisheries sector continued to fall in both 1992 and 1993, contributing to the external current account deficit which amounted to 16.5% of GDP in 1992 and 19.3% of GDP in 1993.

squid and cuttlefish). Mauritania has one of the richest fishing grounds in the world for cephalopods, surface sardinella, sardine, and mackerel.

What is the importance of fisheries to the economy?

7. The sector's contribution to Gross Domestic Product (GDP) rose from 4 percent in 1980 to 10 percent in 1984-85, before falling back to 7 percent in 1987 and to an estimated 5 percent in 1991 because of declining catches.³ Between 1980 and 1986, the value-added of the sector grew in real terms at a compound annual rate of about 28 percent. Since then, however, value-added has been falling at a rate of 10 percent per year.

8. Although the fisheries sector makes a relatively small contribution to Mauritania's GDP, it makes an important contribution to export earnings. The sector is estimated to have generated about US\$308 million (68 percent) of total foreign exchange in 1988, before falling to about US\$278 million (60 percent) in 1989 and to about US\$236 million (54 percent) in 1991. From the point of view of export earnings the small pelagics are the most important and totalled about US\$93 million in 1991. The sector makes a nominal contribution to employment but provides the Mauritanian people with a significant source of animal protein.

9. Mauritania's fish exports go to a narrow range of importing countries: pelagic species (38 percent) are shipped mainly to Eastern Europe, demersal species (11 percent) to Western Europe, cephalopods (30 percent) to Japan and Spain; with the remaining fish sold locally and regionally (21 percent).

10. In addition to direct earnings from sale of fish, the sector contributes to foreign exchange earnings through royalties and license fees paid by foreign operators. As the fishing licenses were curtailed in the early 1980s, foreign exchange earnings declined. But royalties from the sector rose to US\$14 million in 1987, after the signing of the first fisheries agreement with the European Community (EC), and to US\$19 million in 1990, after the signing of a more favorable second agreement. In 1989, following a fall in production, the GOM granted additional licenses for specialized fishing (tuna, lobster, and shrimp).

11. The foreign exchange cost of operating the national fishing fleet is high and is estimated to have been US\$112 million in 1991. Fishing companies have to import vessels, equipment, spare parts, and fuel, and pay for chartering of boats, salaries of foreign fishing crews, and repairs in foreign docks.

12. The contribution to budgetary revenues of taxes on fish exports and of fishing-license penalty-fees in budgetary revenues varied greatly during the early 1980s, before settling to about 19 percent during 1985-89. Taxes on fish exports grew at a compound annual rate of 32 percent from 1980 to 1986, stagnated from 1987 to 1989, fell by an estimated 12 percent in 1990 and rose to 20 percent in 1991. While no data are available for other taxes -- such as income, sales, petroleum products -- paid by the fisheries sector, these are estimated at 5 percent of total budgetary revenue, bringing the total share of the fisheries sector to government revenues to about 28 percent.

3. GDP is probably underestimated, as it appears to exclude various payments to foreign owners of fishing vessels chartered by Mauritians (factors of production) -- a concept used in the calculation of GNP, but not GDP.

What are the main symptoms of the crisis?

13. **Overfishing:** All available information indicates considerable overfishing in Mauritania ⁴. For example, in 1990 the Catch-per-Unit-Effort or Catch-Per-Effort (CUE) in the case of cephalopod species was 55 kg/hour; below the fishing effort level necessary for financially sound vessel operations or satisfactory for a well-managed stock. At the end of the 1970s the CUE for cephalopods was four or five times higher than it is now (which guaranteed high profits and gave rise to a speculative interest in the sector.) The total CUE (cephalopods + demersal fish) for the entire demersal fleet is under 100 kg/hour. Three decades ago catch-per-effort data for the whole fleet in the area was about 1,400 kg/hour. In addition to a decline in CUE, the size of valuable species have become a smaller and lesser proportion of the total catch. This means lower revenues per fishing trip and lower overall sectoral financial returns.

14. **Irrecoverable Loans:** The share of credit to the fisheries sector as a proportion of total credit to the economy rose from 15 percent during 1985-87 to 36 percent in 1991. Medium-term fisheries sector liabilities to the banking sector (including overdrafts, unsecured debts, and gas-oil accounts) are estimated at about US\$110 million. Because of falling revenues, most shipowners are unable, as well as reluctant, to fulfill their debt obligations to the primary banks. The combination of poor catches, increasing operating costs, deteriorating vessels, and uncertainties about marketing arrangements and markets poses a serious problem for credit recovery. These factors seriously jeopardize the restructuring program of the banking sector implemented in the period 1987-89 and threaten the financial stability of the banking system.

Is the crisis unique to Mauritania?

15. The situation in Mauritania may not be uncommon, although it is unusually severe. Many coastal developing countries are experiencing major difficulties as a result of world-wide pressures on the overall fisheries resource base of the world's oceans. These pressures come from some developed countries which are keen to maintain employment in the shipbuilding and fisheries industries of their countries, acquire protein supplies, and influence foreign policy objectives. Since about the late 1980s, more and more coastal stocks of fish have become exhausted as a result of overfishing, which in turn has led to even greater attempts to seek new sources of supply.

16. Some developing countries, short of foreign exchange, came to believe that the riches of the seas were virtually inexhaustible and that fisheries investment was a source of secure and easy money. At the same time many developing states believed that the government should be active in the commercial aspects of the development of fisheries; this mainly took the form of a major presence in the marketing processing and distribution of fish, and sometimes in operating fishing vessels. The model for many of these operations were the Eastern European countries. This model, however appropriate it may have been for Eastern Europe, was highly inappropriate for developing countries because it was based on high levels of government subsidies, artificially high consumer price structures, or both.

17. It has been clear for some time that the fisheries of the world's oceans are not inexhaustible, that fisheries investment is far from risk-free, that fisheries are not a source of easy money, and that a suitable fisheries management regime tailored to the unique situation of the region, area and country is an imperative for all coastal states with significant fisheries resources.

4. Overfishing is not the problem but a symptom of a lack of appreciation for the need to implement workable fisheries management policies.

What is Mauritania's fisheries policy?

18. Mauritania's fisheries policy has evolved over time and led to a Declaration in 1987 which was aimed at: (i) improving fisheries management; (ii) increasing value-added; and (iii) promoting domestic vessel repair facilities. GOM's actions since 1987, however, have not been consistent with its 1987 Declaration on Fisheries Policy. As a result, the fisheries sector has not been a driving force in the creation of value added and employment in the Mauritanian economy. Rather, it is an "enclave sector," with neither upstream nor downstream linkages with the rest of the economy.

19. Fisheries resources in Mauritania are owned and managed by the public sector. The rapid increase in production in the early 1980s was largely due to GOM efforts in the late 1970s. To do so, GOM created several joint ventures with friendly foreign governments to exploit fishing resources, including processing of fish onshore. At the same time, it reduced the number of fishing permits granted to foreign fleets and encouraged Mauritians to purchase trawlers by freely providing credit. It also reserved fishing of the valuable cephalopod species to Mauritians. The Government has also been heavily involved in the research, planning, management, and regularization of the sector, although private sector participation in operating fishing vessels and in fish processing has rapidly increased in recent years.

20. Many of the sectoral difficulties identified reflect serious institutional constraints that include: too many government agencies with poorly coordinated and overlapping activities; inadequate planning and poor definition of crucial functions; inadequate technical manpower; and a less-than-satisfactory record of project implementation. The public agencies have often undertaken functions that the private sector could fulfill more efficiently.

What are the most important sectoral problems?

21. In addition to the serious problems of **overfishing** and **fisheries credit** cited earlier in the report, the following other sectoral difficulties are evident:

- **Resource Management:** The almost complete absence of active management of the fisheries resource is evidenced by the fact that over-fishing is depleting the fishing grounds, in spite of the efforts by the well-established Fisheries Research Institute. While the technical aspect of fisheries surveillance has been improving, less than 50 percent of violations against Mauritanian fisheries regulations are reported, and it is clear that the level of compliance is low. The following facts are indicative of difficulties with the present system: not more than 20 percent of the national fleet possess a radio license or operate in accordance with International Transport Union regulations; no single national vessel bears markings as required by national and international rules; landing logs are not maintained updated; and agreements concluded with foreign companies (originating in the EC and elsewhere) do not require compliance with Mauritanian regulations. Over the period July 1989 to July 1991, a total of 896 violations were recorded; the total amount charged in fines, according to information available on the computer database, was UM259 million. More recent data indicate that by April 1992 a total of 1,340 violations had been reported by the Fisheries Control Department (DCP). The total amount of fines assessed was UM449 million of which about UM210 million were outstanding.
- **Marketing Arrangements:** The Société Mauritanienne pour la Commercialisation des Poissons (SMCP -- Fisheries Marketing Board) had in the earlier years made a significant

contribution to the economy. In recent years, however, the results have been disappointing. As a result, the Mauritians have attempted to privatize fish marketing. But it is unlikely that the recent changes in marketing arrangements will prove satisfactory to the vessel owners or the government.

- **Industrial Fisheries:** The main problems faced by the industrial fleet are fivefold: it is old; its units are of heterogeneous origin; its composition is not suited to the needs of the sector; it is operated mainly by foreign crews; and shipowners cannot pay their debts. The national fleet is composed of 165 units (117 freezer trawlers and 48 ice trawlers) averaging about 20 years old. In 1990-91, less than 99 units were in working condition, with a monthly average of only 34 freezer trawlers and 16 ice trawlers operating regularly. Recent (May 1992) information indicates that even fewer vessels are now operating. Most of the non-working fleet is anchored in the port of Nouadhibou for several months at a time. Some vessels are partially sunk; others remain stranded on the beach. Most of the physical problems in the fleet are caused by poor management (both government-owned joint ventures and private owners did not allocate adequate funds to maintain vessels).
- **Processing Facilities:** Most of the land-based processing capability consists of ice and storage facilities. These cannot meet the Japanese or EC members' quality standards, and would not be approved for food processing in those (or many) other countries.
- **Joint ventures:** In contrast to the private enterprises operating in the sector, two of the three government joint ventures Société Algéro-Mauritanienne des Pêche (ALMAP) and Société Arabe Libyenne-Mauritanienne Pour l'Exploitation des Ressources Maritimes (SALIMAUREN) are for practical purposes bankrupt; only Société de Pêche Mauritano-Soviétique (MAUSOV) enjoys a good financial situation, but its future seems to be in jeopardy, following its decision to buy freezer and ice trawlers and invest in processing equipment and storage, in anticipation of the probable departure of its Soviet partner. The implications of the rapid political changes in Eastern Europe requires analysis from the point of view of the continued viability of export markets for sardines and mackerels.
- **Port Facilities:** Only Nouadhibou and Nouakchott offer opportunities for port infrastructure. In general, landing facilities for the fishing fleet are inadequate, especially as far as fuel and water supplies facilities are concerned. Bilateral studies have been undertaken to address these problems.
- **Artisanal Fisheries:** This sub-sector has created employment and income for a large number of Mauritians. The main drawback it has faced is having to compete with the industrial fleet for the same species in the same fishing grounds. This contributes to the overall resource management problem and the decline in catch and catch-per-effort.
- **Training:** Since Mauritania traditionally has not been a fishing nation and has no labor pool from which to draw commercial fishermen, creating a pool of skilled commercial fishermen and allied skills is vital if Mauritania aspires to control its own fishery. Some steps in this direction have been taken. Since 1988, 247 officer-trainees have been sent for training to the USSR, Spain, Morocco, Algeria, and Tunisia. The fisheries industry view is that shipowners will start to use these trainees and it is expected that within two to three

years, only captains -- and probably classifiers -- will be Korean. On the freezer fleet, there are no Mauritanian captains; while on the fresh-fish fleet there are now some entirely Mauritanian crews.

What development policies and goals are required to restore the sector to profitability?

22. Many problems in the sector have been discussed above and it is appropriate to suggest ways for the sector to again become a source of national wealth on a sustainable basis. There must be a strong commitment on the part of government to bringing fishery back to profitability. The Government must make and enforce policies and laws and regulations which would regulate the fishery for all participants.

23. For the fisheries sector to be developed, there must be put in place a Fisheries Management Regime similar to those developed over the last two decades and successfully adopted by Iceland and New Zealand. For this to be effective many scattered and perhaps conflicting elements in the present fisheries management system must be reconciled. Modern fisheries Management Regimes consist of three complementary elements: Fisheries Management System, Monitoring, Control and Surveillance; and Fisheries Judicial System. Detailed and up-to-date information must be obtained and made available on relevant resources. This would lead to the identification of stock management measures: this implies enforced catch and effort ceilings, as well as increased support for the research to support these efforts.

24. Setting up a system of allocating fishing effort (quotas) once the level of effort is determined is not easy, and it must be done in consultation and eventually with the cooperation of the fishing industry. Various policy options are available for setting up allocation systems, and Mauritania should secure the best advice possible.

25. The aim is optimal exploitation to the country's benefit, bearing in mind the need to ensure the lasting availability of this resource. Some actions geared to accomplish this goal must be coordinated with neighboring countries, in particular Senegal and Morocco, especially as regards the exploitation of migratory species such as tuna and small pelagic fish. For many demersal species Mauritania could move ahead at once.

What recommendations ⁵ emerge from the present review?

26. The mission recommends that the Government of Mauritania make a commitment to:

- reduce the total catching power of the demersal fleet (including any proposed additions), and institute, with the assistance of Centre National de Recherche Océanographique et dans Pêches (CNROP), interim fishing quotas for demersal fishing, until an adequate Fisheries Management Regime (FMR) is established. CNROP should request assistance from FAO to convene a stock advisory panel to evaluate the current state of stocks;

5. The fishery is now worth, at least, US\$250 million (three decades ago it was worth a great deal more.) Such a valuable renewable resource should be worth investing proportion of the revenues derived from the fishery to restore. The data presented by the mission report are indicative of a not-too-distant financial and economic collapse of the fishery sector: once that has taken place it would be very difficult to restore the fishery.

- design and implement an FMR, encompassing a Fisheries Management System (FMS), a Monitoring Control and Surveillance System (MCSS), and a Fisheries Judicial System (FJS). This would help assure a healthy fisheries industry in regard to demersal species and later, with the cooperation of neighboring states, in regard to pelagic species;
- seek an immediate review, by a disinterested third party, of the future prospects of the fishery for small pelagics, in light of the changes in Eastern Europe, particularly regarding markets and prices;
- establish a ban on fishing by pelagic freezer trawlers within 70 nautical miles of the coast of Mauritania to prevent vessels from fishing for high-value demersal species;
- open the capital of SMCP for investment by private sector processing plant, ship-owners and national banks; this should ensure a private sector majority representation on the management board. The goals for the restructured SMCP should be to provide a single and efficient export marketing channel for fisheries products, that would benefit producers as well as ensure that foreign exchange earned by the fisheries sector is repatriated and taxes are collected;
- assist the private sector in preparing investment projects by means of a donor-supported, demand-driven, well-staffed project preparation facility, taking into account the need to integrate these efforts with changes in credit terms and availability in the banking sector;
- attract an experienced foreign partner to establish the framework for a private sector quality inspection and control system for seafood, to secure better export prices and create a mechanism to issue certificates of quantity and quality of cold storage inventories as security for short-term working capital loans from commercial banks;
- establish credit policies that would require: borrower creditworthiness; substantial equity participation; and provisions for adequate collateral. Such qualities as experience in the fishing business, no convictions for fishing violations, a history of keeping a well maintained vessel, and compliance with regulations on vessel markings, safety, quotas, should be considered in the decision to lend;
- identify alternate employment opportunities -- implementing some of these recommendations may result in employment dislocation among Mauritanian workers;
- seek donor support for technical assistance to implement these recommendations, particularly in (but not limited to) planning, establishing and implementing an FMR; developing a high-quality private sector fish processing industry; establishing a unit to assist in the preparation of private sector investment projects; and assessing the future of the pelagic fisheries, and identifying alternative employment opportunities and training requirements for the sector.

27. An Action Plan which integrates both policy and technical recommendations and indicates suggested priorities and indicative timetables for action is presented in Annex 6.

ISLAMIC REPUBLIC OF MAURITANIA

FISHERIES SECTOR REVIEW

I. The Fisheries Sector

A. Introduction

Country Background and Economic Setting

1.1 Mauritania has a population of 2 million and very limited resources. Virtually all of its 1.1 million km² of land is desert. Its main economic activities are iron ore mining and offshore fishing in the north, and agriculture and livestock activities in the Senegal River Valley in the south. As a result of drought and difficult economic conditions there has been a substantial migration to urban centers, where about half the population now live. Most of the population suffer from extremely low standards of living, as reflected in key social indicators. Per capita income in 1991 was US\$500. Revenues from iron ore, which once represented the largest source of foreign exchange earnings, have declined, reflecting falling demand and prices on the world market since the mid-1980s. Fish exports have become the main source of foreign exchange earnings, generating 54 percent of the total export earnings in 1991. But, declines in 1990 and 1991 production were a clear indication of depletion of the fish resources.

1.2 Traditionally most of the population were nomadic desert dwellers. In the late 1970s this began to change to a way of life concentrated around the capital city of Nouakchott and Nouadhibou, the main port city. At about the same time interest in the fisheries grew, because drought had made life in the desert more difficult and additional protein food supplies were required.

1.3 Fisheries in Mauritania grew remarkably over 1984-86, when catches increased from 286,000 mt to 591,000 mt -- a compound rate of about 44 percent per annum. Although total landings¹ decreased from 381,000 mt to 274,000 mt during 1987-91, the total catch was estimated at 563,000 mt in 1987 and 446,000 mt in 1991.

Physical Environment

1.4 The Eastern Central Atlantic, designated Food and Agriculture Organization (FAO) statistical area 34, includes an area of about 13.9 million km² and is one of the world's most productive and most heavily fished regions. It is covered by the Fishery Committee for the Eastern Central Atlantic (CECAF) of FAO.

1.5 The coast of Mauritania extends in a generally north-south direction for about 525 km between Cape Blanc (20°50'N) and the mouth of the Senegal River (16°05'N). The area is shown in Map IBRD 22261. The strong upwelling which occurs along the coast from September to May brings nutrient-

1. Catch refers to all fish caught recorded as landed in Mauritania. Not all caught fish are landed, those caught by licensed vessels, for example.

rich water to the surface in a broad frontal zone extending to 10°N (Guinea coast) in the winter. The movements of the upwelling front have important effects on the distribution and abundance of surface-associated (pelagic) species and some effect on the bottom-associated (demersal) species.

1.6 The wide continental shelf, rich in marine life, extends between 50 km and 130 km seaward and is shallow in the region of d'Arguin Bank. The approximate area of the continental shelf to depths from 0 - 200 m is 36,000 km².

1.7 The fisheries of the Eastern Central Atlantic (and those off the coast of Mauritania in particular) have been the object of intense and increasing fishing since at least 1950. Since the early 1960s, vessels from about a dozen major foreign fishing fleets caught and processed fish at sea or landed their catch at Las Palmas in the Canary Islands for processing and export. Before 1970, vessels fishing beyond 6 miles from the coast of Mauritania were not considered to be in Mauritanian waters; this boundary was extended in 1971 to 12 miles, and to 30 miles in 1972. In 1979 Mauritania declared a 200-mile Exclusive Economic Zone (EEZ).

B. The Resource Base

Marine Resources

1.8 Marine fish resources in Mauritania fall into two basic groups: (i) demersal species – associated with the bottom of the sea and including octopus, lobster, shrimp, hake, and bream; and, (ii) pelagic species – which are surface associated – and consisting of mackerel, sardine, sardinella, and tuna.

1.9 It is important to establish the status of commercially valuable fish populations (stocks). Since catch and landings are not equivalent and catch (by species) has the most relevance to the status of stocks, landing information from Mauritania is not an adequate basis for determining the stock status. And catch data are not available from many of the vessels which fish in Mauritania's EEZ. But estimates of catch for important commercial species of the northern portion of the CEEF (Mauritania) were published in 1987 as part of FAO's review of the state of world fisheries resources. The data for important pelagic and demersal stocks are shown in Figures 1 and 2². Similar data which cover the catch of Japanese vessels operating in that area in 1959 - 1975 are shown in Figure 3. These data may be taken as reasonable surrogates.

1.10 The fishery for octopus is among the most valuable in Mauritania in volume and price. Data on the relationship between catch and fishing effort for octopus over 1966-1986 are shown in Figure 4³.

1.11 The status of the marine resources of Mauritanian EEZ was reviewed by the Mauritanian Centre National de Recherche Océanographique et des Pêches (CNROP), FAO and the French Institute for Scientific Research for Development and Cooperation (ORSTOM) in 1985, and by CNROP in 1991. The main findings are summarized in Table 1 and indicate serious over-exploitation.

2. Review of the State of World Fishery Resources. Committee on Fisheries, 17th Session, Rome, 18-22 May 1987. COFI/87/inf.4 January 1987. FAO, Rome. (COFI, Committee on Fisheries of FAO)

3. After Gilly et Maucorps, 1987 in *Les Ressources Halieutiques de la Zee Mauritanienne: Description, Evaluation et Amenagement*. République Islamique de Mauritanie: Ministère des Pêches et de l'Economie Maritime. CNROP/FAO/ORSTOM, Rome 1989.

Table 1
Status of Important Commercial Species
of Mauritania

SPECIES GROUP	mt '000 *	RESOURCE STATUS
Pelagic Species		
Horse Mackerels	170	Over Exploited (125%)
Other Mackerels	30	Heavily Exploited (80%)
Sardinellas, etc.	140	Moderately Exploited (45%)
All Tunas	15	Fully Exploited (95%)
Other Small Pelagics	110	Over Exploited (175%)
Demersal Species		
Octopus	48	Over Exploited (150%)
Cuttlefish	10	Over Exploited (125% +)
Squid	6	Over Exploited (100% +)
Sparids (Brems)	50	Severely Over Exploited (160% +)
Other Demersals	35	Mostly Fully Exploited (?%)

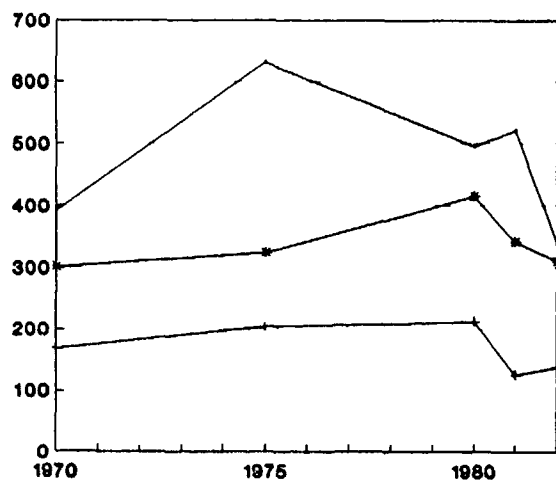
* These amounts are approximate estimates of the maximum sustainable yield. Almost every stock listed is on the decline side of a catch-per-effort curve (the more effort expended, the less catch results).

Source: Data; after Josse and Garcia, 1985: Status; WB (World Bank)

1.12 The data in Figures 1-4 and other available data⁴ also indicate that for most higher-value species significant overfishing has existed for some time for demersal and pelagic species.

4. Mauritania: Fisheries Development and Management Policy in the Exclusive Economic Zone. Technical Cooperation Program. FAO, Rome, 1981.

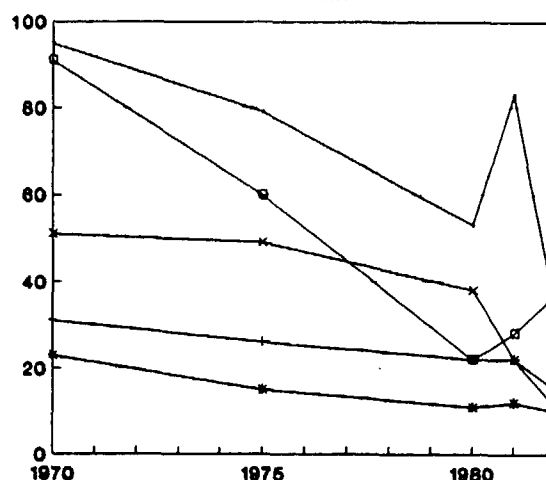
Figure 1
Pelagic Catch N CECF
1970 - 1982
'000 mt



— European Sardine + Sardinellas
* Horse Mackerels

Source: FAO COFI/87

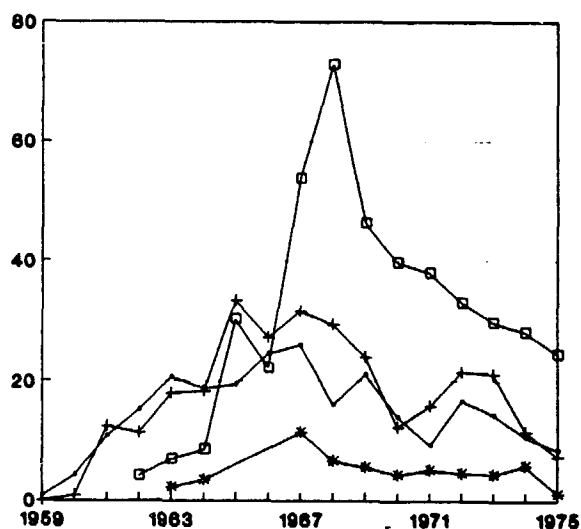
Figure 2
Demersal Catch N CECF
1970 - 1982
'000 mt



— Octopus + Cuttlefish * Squid
x Sea Bream x Hakes

Source: FAO COFI/87

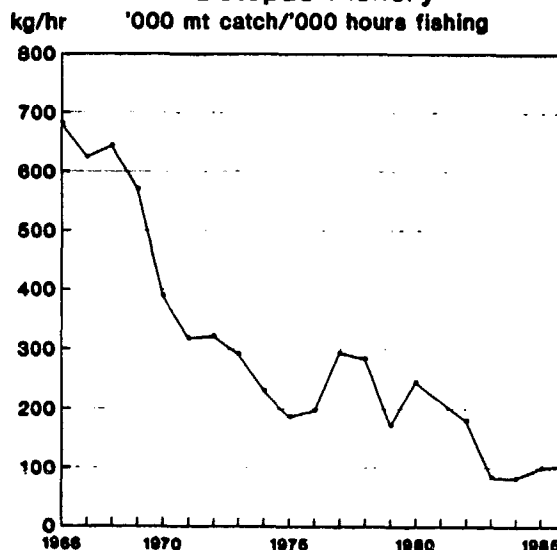
Figure 3
Catch N CECF
(Japanese Vessels)
'000 mt



— Sparids + Cuttlefish * Squid x Octopus

Source: Greboval 1982

Figure 4
Catch per Effort
Octopus Fishery
kg/hr '000 mt catch/'000 hours fishing



(Mauritania-Cap Blanc)

— Octopus

Source: CNROP/FAO/ORSTOM 1988

1.13 The total Catch-per-Unit-of-Effort (CUE) for the entire fleet in 1991 is under 100 kg/hour, which contrasts sharply with 1,482 kg/hour recorded in 1964. The average CUE for the five year period 1964-1968 was 1,046 kg per hour⁵. Even at the end of the 1970s the CUE for cephalopods was four or five times higher than it is now (1991).

1.14 Total estimated catch for all types of fishing 1986-1990 in Mauritania is shown in Table 2. These data place the total catch for 1986 at 591,000 mt and for 1990 at 446,000 mt, a decrease of 25 percent.

Table 2
Estimated Catch by Fisheries Category (mt)
Mauritania

<u>Category</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
Traditional artisanal fishing	10,000	10,851	12,971	7,487	6,187
Modern artisanal fishing	6,000	9,000	9,054	6,696	4,240
Sub-total	16,000	19,851	22,025	14,183	10,427
Demersal glacier fishing (various sites)	12,200	12,950	6,919	6,390	5,145
Demersal freezer-trawlers	55,000	60,859	42,432	43,801	37,891
Pelagic freezer-trawlers	486,000	449,184	417,856	411,340	364,740
Specialized fishing					
Tuna, hake, ...	17,000	15,260	18,355	22,759	23,192
Shrimp, lobster	5,000	4,638	5,295	5,329	4,411
Sub-total	575,200	542,891	490,767	489,239	435,379
including:					
Authorized boats	50,120	59,448	44,345	48,964	42,376
Chartered boats	478,280	441,621	413,292	396,984	335,982
Licensed boats	46,800	41,822	33,130	43,291	57,021
<u>TOTAL</u>	<u>591,200</u>	<u>562,742</u>	<u>512,792</u>	<u>503,422</u>	<u>445,806</u>
including estimated "undeclared" catches					
	(26,000)	(23,800)	(10,269)	(19,428)	(16,089)

Note: About 5 percent is produced by artisanal fishermen; industrial fishing produced 95 percent of all catches.

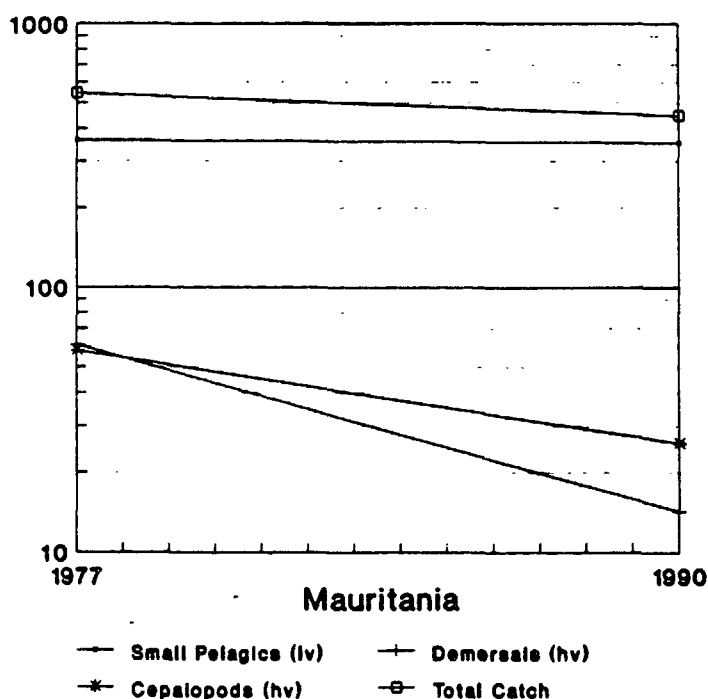
1.15 Data of the type shown in Figure 4 are not available for the other major species involved in the fishery, but the data for octopus are regarded as representative of the overall trend. These data show that increasing levels of fishing effort were applied to the octopus stock. This resulted in an absolute decline in stock over the period studied. The implications for fisheries management are discussed in Annex 2.

Catch and Value

1.16 Not all the species groups are equally valuable. The important higher-value demersal species groups are the cephalopods (octopus, cuttlefish, squid) and sparids (bream, sole, grouper). The important lower-value species groups are the small pelagic (sardines, mackerels, sardinellas). The value of the higher-valued species groups compared to the lower-valued ones is between 20 and 200 times greater.

1.17 The catches of most higher-value species fell by 55-70 percent from 1977 to 1990; catches of lower-value small pelagics fell by about 2 percent, while total catch fell by 18 percent, as shown in Figure 5.

Figure 5
Trends in Catch Value
High vs. Low



'000 mt

C. Government Policy and Institutional Framework

Fisheries Policy

1.18 Before 1978 there was no coherent fisheries policy. The policy adopted by the Comité Militaire de Salut National in 1979 was designed to bring the exploitation of Mauritania's fish resources progressively under the control of nationals. It sought to gradually replace the old system of fishing licenses through a policy of integrated development for the sector, aimed at the following:

- Establishing joint ventures of Mauritanian choice, if possible, controlled by Mauritians;
- Landing catches in the port of Nouadhibou for processing and storing in the existing cold-storage facilities;
- Controlling the marketing of fisheries products in Mauritania through the establishment of a state corporation, the Société Mauritanienne de Commercialisation des Poissons (SMCP);
- Establishing a national fisheries industry;
- Developing artisanal fisheries as a means of ensuring fish supply for the domestic market;
- Creating new employment; and
- Developing fisheries expertise.

1.19 Implementation of this policy led to better national control of fisheries activities and made it possible to lay the foundations for a national industry by reserving all demersal fisheries for the domestic fleet. The industry grew to include Mauritanian shipowners, and a few joint-venture companies in which Mauritians held majority interests. Investment focused on constructing onshore plants. Jobs were created, and a transfer of technology realized. The consequent increase in exports brought in foreign exchange for the economy and direct receipts for the state budget. These results were extremely positive for the country.

1.20 As concerns about the depletion of fishing grounds increased, however, the Government issued a new Declaration on Fisheries Policy in 1987, which was one of the conditions for tranche release under the Structural Sector Adjustment Loan I (SAL I). The main purpose of this measure was to improve the management of fisheries resources. Under the policy, the Government sought to:

Improve the management of fisheries resources. Strict limits were imposed on the volume of catch by species and on the number of fishing trawlers through a policy of not granting new authorizations to import fishing trawlers. Some fishing zones were closed to preserve spawning grounds. With the support of Germany and France the Government also increased the surveillance of its waters to enforce this new policy.

A trawler was equipped for the task, and in July 1990, the Federal Republic of Germany (FRG) provided an additional surveillance vessel and two refurbished airplanes;

Increase national value-added. The Government proceeded to "mauritanize" fishing crews: one third of the fishing crews were required to be Mauritanian, and a plan was drawn up for training a sufficient number of Mauritanian officers in Algeria, Tunisia, Morocco, and the USSR to replace most of the foreign officers. But this policy was resisted by local operators, who feared a sharp fall in productivity and in the quality of export products, particularly cephalopods which are a fragile species that fetches the highest prices when properly processed and protected against bruising -- a task requiring a high level of expertise; and

Promote onshore repair facilities (floating repair dock). The Government encouraged the creation of a private company, by taking a 10-percent participation in its capital. The company purchased a floating dock to provide regular maintenance operations on trawlers. The dock started operations in 1989 and apparently has worked full time since then. There are indications, however, that operators are under pressure to use the on-shore dock. This has allowed the new floating dock (which initially charged less for repairs) to increase its price to a level comparable to those of foreign docks.

1.21 If government policy was largely responsible for the rapid increase in net foreign exchange earnings and tax payments during 1985-87, it was partly responsible for increasing overfishing and deterioration of the fleet. Fishing operators faced administrative difficulties in obtaining foreign exchange, and this resulted in postponements of necessary maintenance. Operators had incentives to continue operating inefficient fishing vessels. Companies wishing to expand operations could do so only by incurring the extra expense of buying second-hand units, and then seeking the necessary authorization to replace them. Day-to-day decisions have been largely reactive rather than part of a planned design.

1.22 The major objectives of the Government's fisheries sector policy both in 1979 and 1987 were to: 1. maximize the sectoral value-added; 2. increase employment opportunities; 3. increase sector contribution to the balance of payments and government revenues; and 4. increase local fish consumption. Of these objectives, only the third has been achieved.

Fisheries Policy: Impact on Budgets and Banking

Budget Expenditures for Fisheries

1.23 Considering its economic potential, the fisheries sector has been well funded in both Public Investment Programs (PIP) and Annual Consolidated Budgets. However the resources allocated to fisheries have never been fully used, reflecting the poor implementation capability of institutions dealing with the sector. The financial allocation and expenditures for the fisheries sector during the two PIPs are shown in Table 3.

Table 3
Financial Planned Budgets for the Fisheries Sector, 1985-91

Plan	Budget - Expenditure (UM million)		
	Budget	Expenditure	% Spent
1985	241	123	51.0
1986	626	143	23.0
1987	745	396	53.0
1988	1178	325	28.0
1989	645	469	73.0
1990	1501	327	22.0
1991	1272	500	39.0

Fisheries and the Banking Sector

1.24 There is no formal credit system for fisheries. Credit has largely been available through the Development Bank of Mauritania (UBD) and through the private banking system. Credit for fishing vessel owners and joint venture partners has been extremely easy to obtain and banks have belatedly discovered that the terms and conditions for loans were not sufficiently collateralized. The banking system was not sufficiently familiar with the specialized ways in which fisheries loans should be appraised and supervised.

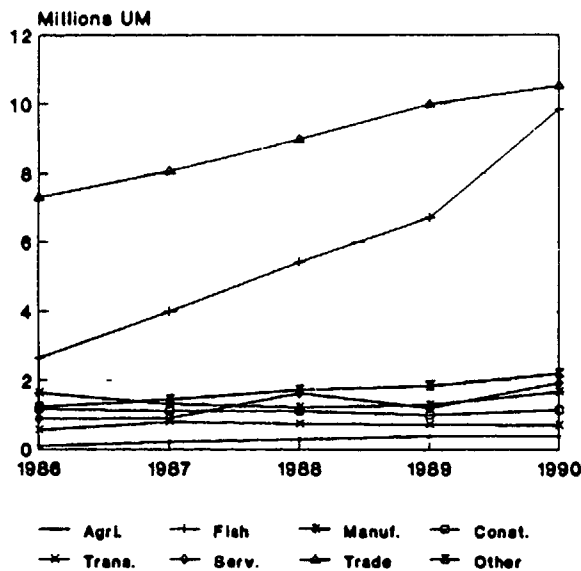
1.25 According to data of the Banque Centrale des Mauritanie (BCM), the Central Bank, about 90 percent of the total credit distributed in 1986-1990 was short-term (less than two years); the remainder was medium-term (two to eight years). Long-term credit was almost non-existent. The proportion between the two main types remained broadly unchanged during the period. From 1986-1990, major shifts in the distribution of sectoral credit occurred as shown in Figures 6 and 7. Fisheries show the greatest change in sectoral lending over the period in both short-term and medium-term credit.

1.26 The share of credit to the fisheries sector in total credit to the economy rose from 15 percent during 1985-87 to 36 percent in 1991. Total fisheries sector liabilities to the banking sector for medium-term loans alone are estimated at US\$110 million.

1.27 This situation is particularly unfortunate, since a costly banking sector restructuring program, including recapitalization of the primary banks, was carried out under the SAL operation during 1987-89. The Central Bank has not so far honored its commitment to allow shipowners to keep 25 percent of the foreign exchange they earn. This makes procurement of spare parts particularly difficult and irregular practices commonplace (for example, routine overpricing of imports).

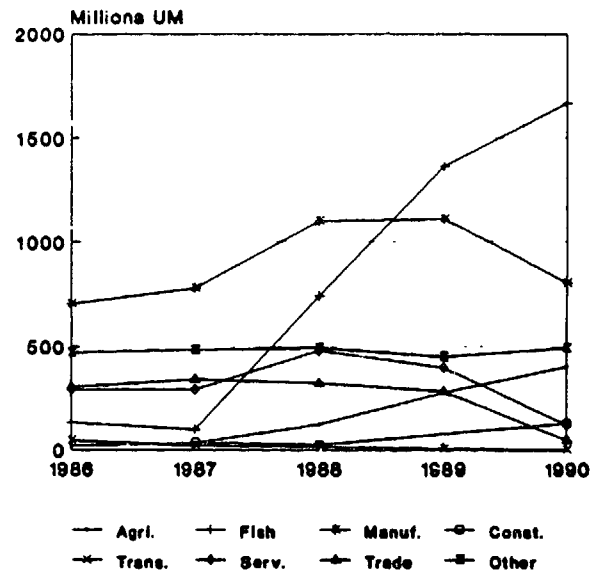
1.28 The recent trends in deteriorating vessel maintenance, declining catches, poor product quality, uncertain markets, increasing operating costs, and ambivalent or negative shipowner attitudes create serious problems for credit recovery. These trends have seriously jeopardized the earlier restructuring of the banking system and now threaten the financial stability of the banking system as a whole.

Figure 6
Short Term Bank Credit
Mauritania



(Excludes Mining)

Figure 7
Medium Term Bank Credit
Mauritania



(Excludes Mining)

Policy Constraints

1.29 In the coming months the Government will face difficult alternatives and will need to seriously examine its policies because of:

- a decline in catch, particularly for the higher-value species;

- changes in the operational mode of state-owned fish marketing;

- the lack of a program for high-quality processing to add value to high-value export products;

- the future of bi-lateral licensing agreements;

major uncertainties regarding the future of joint ventures with Eastern European countries which both catch and export species which contribute to the economy; and

the highly adverse impact on the financial sector of the recent poor performance of fisheries, and the likelihood of major credit recovery problems.

Institutional Framework

1.30 Fisheries resources in Mauritania are owned and managed by the public sector. As a result, government agencies have been heavily involved in the research, planning, financing, management, and regularization of the sector. Private-sector participation in fisheries development has rapidly increased in recent years.

1.31 Of about a dozen government agencies dealing with the fisheries sector, the most important is the Ministère des Pêches et de l'Economie Maritime (MPEM), which has overall responsibility for the sector. Key fisheries institutions are listed in Annex 3.

Centre National de Recherche Océanographique et des Pêches (CNROP)

1.32 This is a Government institute established by decree and is responsible to MPEM. CNROP carries out research primarily in three areas: physical oceanography, marine and environmental biology, and stock assessment and resource management. The Centre is well regarded internationally, but it has had little influence on fisheries management in Mauritania.

Fisheries Control Department

1.33 No concerted, coordinated civilian approach to fisheries surveillance and control existed in Mauritania before the creation of the Fisheries Control Department (DCP) in 1988. Until then, the National Navy patrolled the waters, with no brief from the ministry in charge of fisheries. No system for the collection of data on catches existed until 1990.

1.34 Accepting the recommendations in studies carried out by Crown Agents in 1985/86 with funding from the Kuwait and Arab Funds and the World Bank, the Government included a new department for fisheries surveillance and control in the structure of the MPEM and the DCP.

1.35 One condition for the structural adjustment credits provided to the Mauritanian Government in 1988/89 by the World Bank was the implementation of a fisheries surveillance and control project comprising, as an essential element, a fisheries surveillance vessel capable of carrying out extended patrol duty.

1.36 With the financial assistance of the FRG, a suitable vessel was acquired in July 1989. It was initially chartered for 18 months and then purchased by the Government through a financial contribution by the Kreditanstalt für Wiederaufbau (KfW).

1.37 The pilot technical assistance project under which the vessel, the N'Madi, was initially chartered was continued into a main phase of three years' duration (January 1991 to December 1993).

KFW's contribution, totalling DM8.1 million, covered the purchase of spare parts, repairs abroad, and additional investments on the vessel for 1991-95.

1.38 The technical assistance project funded by FRG provided for a complete overhaul of the two surveillance aircraft. The first was returned after a total overhaul in February 1990, and the second in September 1991. Communications equipment was installed at the DCP, and the introduction of a fishing log-book system was made possible, through printing catch and landing log-books.

1.39 There are at present six FRG experts in Mauritania: a team leader, a data-processing specialist, an expert in fisheries control working on shore as well as on board, a nautical advisor, and two mechanics on board the N'Madi.

1.40 Through the FRG project, it has been possible to program a comprehensive databank system at DCP, which records all information on control activities and processes infringements and data from the catch logs. This databank is part of a centralized computer-based fisheries statistical system being developed by the DCP and the CNROP -- all data processed by either the Ministry of Fisheries and Marine Economy, the DCP, the CNROP, or any other institution (in future, for instance, the computer network being installed by the Navy will carry the same codes) could be transferred and used by all participants in the system.

1.41 Other donors have provided funding. The World Bank has financed the furnishing of the DCP offices, the installation of a core of computer hardware, and the training of personnel. French funding secured the overhaul of two naval vessels in 1989 and the purchase of spare parts for the existing patrol boats. A group of French Navy technicians is assisting the Navy workshops in Nouadhibou, to the benefit of the naval vessels and the N'Madi.

1.42 Results of Fisheries Surveillance and Control to Date. Since 1988, the effort put into fisheries surveillance and control has been considerably increased. In 1988 the Navy reported 365 days at sea for this purpose, and is said to have maintained a level of 300-350 days at sea per annum since then. To this must be added the days spent at sea by the vessel of the MPEM, the N'Madi, which was on patrol for 111 days during July-December 1989 and 196 days in 1990. Flying hours for surveillance and control totalled 495 in 1988 and more than 600 each year since.

1.43 Compliance. The level of compliance with Mauritanian fisheries regulations cannot be quantified, as no objective indicator exists.

1.44 Considering that fishing is a 24-hour activity, it can be surmised that less than 50 percent of all violations committed are reported, fewer reach the formal complaint stage and even fewer reach the court system. This estimate is low compared with what prevails in European fisheries; one may safely conclude that the level of compliance with Mauritanian fisheries regulations is low.

1.45 It is clear that the level of compliance would be even lower without the surveillance and control efforts underway, and indications are that for certain offenses, such as fishing in prohibited areas, compliance has improved.

1.46 In some specific activities, the level of compliance can be indicated more precisely:

Not more than 20 percent of vessels bearing the national flag possess a radio license, in observance of national and International Transport Union (ITU) regulations;

Not a single vessel bearing the national flag conforms to the legislation on the marking of fishing vessels;

Introduction of the requirement to maintain a catch-log has been surprisingly successful, (no doubt because of control and enforcement measures). There are, however, great difficulties in obtaining compliance, particularly from the national fleet, with the requirement to maintain a landing-log; and

As far as foreign vessels are concerned, the level of compliance with rules and newly introduced measures, such as catch-log and landing-log requirements, is high within the chartered pelagic fleet; there are great difficulties within the European Community (EC) fleet. The Government has failed to negotiate inclusion of the requirement to comply with its own rules and regulations in the fisheries agreement with the EC (in the absence of such a fisheries agreement, EC vessels would have been compelled -- by EC regulations -- to comply with Mauritanian catch-log regulations).

1.47 Procedures for Treating Reported Violations Violations are dealt with by the Consultative Inspection Board (CCA), who submits proposals to the Minister of Fisheries and Marine Economy on fines to be charged, or to recommend waivers. Only in the event of a fine being contested by a vessel-owner would the case be handed over to the public prosecutor. To date, there is no specialized fisheries jurisprudence in Mauritania. This lack of interpretation and legal commentary on the application of legislation is a deterrent to the development of the fisheries surveillance and control system. Please see Annex 1.

1.48 Over July 1989 to July 1991, 896 violations were recorded, and the total amount charged in fines was UM259 million. Figures on fines paid have not yet been entered into the database, but it appears that the amount outstanding is about UM150 million; part of which is deemed unrecoverable because, for instance, the vessel-owner has gone bankrupt, or the vessel has left Mauritanian waters.

1.49 More recent data show that by April 1992 a total of 1,340 violations had been reported by the DCP. The total amount of fines assessed was UM449 million of which about UM210 million is outstanding.

1.50 The CCA has been known to handle similar cases quite differently and dealt with several offenses by one vessel either separately or as a package. Lower fines have been ordered: a backlog of reported violations has accumulated.

1.51 Some progress has been made; minor offenses can now be dealt with immediately in Nouadhibou, and the CCA has become a permanent body.

The Marketing Board Monopoly

1.52 The Société Mauritanienne de Commercialisation du Poisson (SMCP) was established in 1984 by Decree 84-130, and was given the monopoly for marketing fish that boats were obligated to land at the port of Nouadhibou. There were 3 exceptions to the monopoly: (i) some pelagic species caught by the Société de Pêche Mauritano-Soviétique (MAUSOV) and the Société Industrielle Mauritano-Roumanienne de Pêche (SIMAR); (ii) certain high value species caught by Société Algéro-Mauritanienne de Pêche (ALMAP) for the Algerian market; and, (iii) the small amounts of fish caught by local artisanal fishermen.

1.53 The creation of SMCP was inspired by the need for the Government to control the payment of export taxes on fishes and the repatriation of foreign exchange earnings. Over time, however, SMCP became overstaffed and inefficient and its financial transactions devoid of any transparency. Moreover, in spite of its position, its net profits kept declining, resulting in a loss in 1991. SMCP's operations resulted in a decrease in incentives to fishermen and in a sharp reduction in the fishing fleet operating in the Mauritania waters. This in turn led to unpaid loans to the banking sector by the fishing industry.

1.54 But the problem that became obvious was that the State had no reason to be in the fish export business. While it is recognized that there were merits to centralize the collection of taxes and foreign exchange, there was no justification at all for leaving the commercial aspects of fish marketing to the State, particularly given the complex and highly technical aspects of such marketing and the enormous risks. It is for this reason, that in the context of the PFP, the Government decided to privatize SMCP.

1.55 The privatization of SMCP will, however, allow limited participation by the Government, in order to provide the State with some degree of oversight. This arrangement should increase the efficiency of SMCP and the sector and ensure that foreign exchange is repatriated and that taxes are collected.

The Joint-Venture Companies

1.56 The chief economic instruments of the Government's fisheries policy have been the joint-venture companies, a majority (51 percent) of whose shares must be held by Mauritanian entrepreneurs and the rest (49 percent) by foreign partners. The latter were required to contribute the full amount of the capital in return for the authorization to fish. The profits made were to be used in part to repay the transfers by the foreign partners in furnishing the capital. Each company was to submit a program of onshore investments, comprising freezing installations, storage facilities, ice plant, and procurement of wet-fish trawlers.

1.57 The joint ventures can be classified into three groups:

Public companies formed with the participation of other States (MAUSOV with the USSR, SIMAR with Romania, ALMAP with Algeria, Société Arabe Libyenne-Mauritanienne Pour l'Exploitation des Ressources Maritimes (SALIMAUREM) with Libya);

Companies owned by Mauritanian citizens and foreign interests (Compagnie Mauritano-Coréenne de Pêche, (COMACOP) and a private sector fishing company (SIPECO); and

Companies owned by the Mauritanian state in association with private Mauritanian entrepreneurs and foreign interests (Mauritanian-Chinese Company).

1.58 In general, the joint ventures suffer high financial losses (as shown in Table 4) owing to dubious onshore investments, poor utilization of their vessels and high operating costs. To these problems must be added management deficiencies.

1.59 Although the joint-venture companies' capital has to be 51 percent Mauritanian-owned, foreign citizens control a large part of the management and technical activities (catching, freezing, and onshore storage). The Mauritanian capital partners and top management have become intermediaries between foreign partners and the Government, rather than entrepreneurs taking risks and reinvesting profits.

1.60 The Government joint ventures will no doubt be subjected to increasing difficulties, because many Eastern European countries are restructuring their economies. As these countries move to value the costs of fuel and other operating expenses at world market prices, the costs of fishing operations based on low-value pelagic species, such as sardines and mackerel, will be seen as considered no longer financially viable. The continued operation of vessels from the Eastern European countries will face other unforeseen difficulties.

1.61 Mauritania cannot assume that because the USSR operated the biggest pelagic fleet for years Mauritania could take over the operations. Most Eastern European fishing operations were operated with substantial direct and indirect state subsidies, and the market structure of the Eastern European fishing industries was not comparable with those of free market fishing industries.

Training

1.62 As regards formal training of crews, fishermen have received some minimal instruction ("recyclage") at Nouadhibou's Professional Training Center (CFPM) for a number of years. The CFPM was established by a 1979 decree. Between 1982 and 1988, approximately 800 fishermen followed three-month courses, after which they were issued with professional cards.

1.63 Since 1988, 247 officer-trainees have been sent for training to the USSR, Spain, Morocco, Algeria, and Tunisia. The shipowners associations (FIAP/FIAPÉCHE) expect that within two to three years, only captains -- and probably classifiers -- will be Mauritanian. On the freezer fleet, there are no Mauritanian captains; on the fresh-fish fleet there are now some entirely Mauritanian crews.

Institutional Constraints

1.64 Major institutional problems that adversely affect the development of the fisheries sector include: too many agencies with poorly coordinated and overlapping activities, inadequate planning and poor definition of crucial functions, inadequate technical manpower, and a less-than-satisfactory record of project implementation. The public agencies have often undertaken functions that the private sector could fulfil more efficiently. The agencies lack a macroeconomic and sectoral perspective needed to properly articulate the place of fisheries in planning the economic development of Mauritania.

Table 4
Income of Public-Sector Fisheries Companies, 1989-90
(UM)

	MAUSOV		ALMAP		SIMAR		SALIMAUREM	
	1989	1990	1989	1990	1989	1990	1989	1990
Total production	5,543,166	5,611,709	995,931	875,426	2,860,308	1,043,638	412,717	199,942
Internal consumption	3,989,019	4,012,495	563,436	620,620	2,126,056	845,082	240,475	135,336
Income before depreciation & financial expenses	391,680	651,636	133,337	-16,023	244,952	-89,081	-28,739	-103,033
Income before depreciation & provisions	405,667	684,614	50,739	-104,602	262,842	-69,633	-32,459	-126,132
Operating income	364,706	666,899	-112,084	-268,803	198,967	-113,443	-157,846	-206,009
Income before tax	360,379	572,069	-123,725	-556,003	112,805	28,483	-179,370	-211,021
NET INCOME	216,227	295,025	-138,439	-566,651	64,002	23,031	-179,370	-211,021

Source: CRSP

D. Role of Fisheries in the Economy

Fisheries in the Economy

1.65 Although the fisheries sector makes a relatively small contribution to Mauritania's GDP, it makes an important contribution to export earnings and employment and provides the Mauritanian population a significant source of animal protein.

Employment

1.66 Estimates of employment in the fisheries sector vary widely among sources. However, 7 to 10 thousand people are estimated to be employed in primary, secondary, and tertiary fisheries-related activities -- including fishing, fish trade, fish processing, the manufacture of fishing gear -- as well as in such public sector agencies as the MPEM, CNROP, SMCP, DCP, and the private sector processors, and shipowners' associations.

Nutrition

1.67 Fish is expected to remain an integral part of the Mauritanian diet. According to a household expenditure survey, 46.4 percent of the urban population and 56 percent of the Senegal River Valley population eat fish at least once a week. As for other rural areas, the survey shows that only 2.4 percent eat fish. These trends should concern policymakers, because they indicate deteriorating nutritional standards among the rural poor. A targeted approach to expanding artisanal fish production and rural consumption could increase per capita fish intake and protein availability and improve the purchasing power of the artisanal fishermen.

Value-Added Status

1.68 Between 1980 and 1986, the value-added of the sector grew in real terms at a compound annual rate of about 28 percent. Since then value-added has been falling at a rate of 10 percent per year. As a result, the sector's contribution to GDP rose from 4 percent in 1980 to 10 percent in 1984-85, before falling to 7 percent in 1987 and to an estimated 5 percent in 1991.⁶

Fisheries Exports, Foreign Exchange Earnings and Costs

1.69 Mauritania's fish exports go to a narrow range of importing countries: pelagic species are shipped mainly to Eastern Europe, demersal species to Western Europe, mainly to France, Italy and Spain, while cephalopods are shipped to Japan and Spain. The future of exports to the Eastern European countries is unclear as is the situation in regard to the fishing fleets, fishing agreements and markets of the Eastern European countries.

1.70 The contribution to Mauritania's export earnings by the fisheries sector has increased from 60 percent of total exports in 1980 to 68 percent in 1988, before falling to about 60 percent in

6. Figures for fisheries sector value-added are probably underestimated, as they appear to exclude various payments to foreign owners of fishing vessels chartered by Mauritians -- factors of production -- a concept used in calculating Gross National Product (GNP), but not GDP.

1989 and to 54 percent in 1991. Although the sector relies on imported inputs, such as boats, engines, diesel fuel and consumable materials, its overall contribution to foreign exchange earnings remains substantial, as shown in Table 5:

Table 5

	Fisheries Sector Foreign Exchange Earnings						
	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
Exports							
Value (US\$m)	224.8	274.2	267.9	290.6	257.0	217.8	220.4
TM (000)	285.6	385.6	381.3	352.2	322.3	282.9	269.0
Royalties	7.0	6.9	14.0	10.8	14.8	13.5	12.0
Other		4.7	5.8	6.9	6.2	6.2	3.3
<u>Total foreign exchange earnings</u>	231.8	285.8	287.7	308.3	278.0	237.5	235.7

Source: BCM

1.71 Licensing Agreements In addition to export earnings, the sector contributes to foreign exchange earnings through royalties and license fees paid by foreign operators⁷. As the issuing of fishing licenses was curtailed in the early 1980s, so were foreign exchange earnings from that source. But royalties from the sector rose to US\$14 million in 1987, with the signing of the first fisheries agreement with the EC. In 1989, following a fall in production, the Government granted additional licenses for specialized fishing.

1.72 A more favorable second licensing agreement with the EC was negotiated for a period of three years, starting August 1, 1991. The total financial compensation to be paid by the EC under this Mauritania-EC Fisheries Convention amounts to ECU27.75 million, to be paid in three annual tranches. In addition, the EC will: finance scientific and research programs in the fisheries sector for ECU900,000; and contribute up to ECU360,000 towards training Mauritanian staff at international institutions of higher learning.

1.73 Statistics on the catches of the licensed fleet are not reliable, since fees are charged on the basis of a vessel's Gross Registered Tonnage, and reporting catches in quantity or quality is not compulsory. For the periods August 1990 to July 1991 and August 1991 to July 1992 the transfer value of vessel fees, paid in the context of the EC/Mauritania Fisheries Agreement (in addition to the overall amount paid by EC), amounted to ECU13.5 million in 1990-1991 and ECU12.0 million in 1991-1992. The extent to which fishing was undertaken in respect to the agreement is shown in Annex 4. Tables 1-2, and 3 detail the scale of payments under the agreement.

7. Up to 1983, licenses to fish in Mauritanian waters were issued on a vessel-by-vessel basis. There was later a period when the EC, Japan, and others, negotiated licenses on a species-by-species, vessel-by-vessel basis for flag vessels of their countries to fish in Mauritania's waters. In addition, individual vessels pay a fee to fish which is prorated according to the vessel's Gross Registered Tonnage (see Annex 4 Table 3).

Foreign Exchange Operating Costs

1.74 These costs are high, as shown in Table 6. Fishing companies have to import vessels, equipment, spare parts, and fuel (which is imported through the national oil company), as well as pay for the chartering of boats, salaries of foreign fishing crews, and repairs in foreign shipyards.

Table 6
Foreign Exchange Cost of Operating National Fishing Fleet
(US\$M)

	1985	1986	1987	1988	1989	1990	1991
Total imports * including:	166.0	175.6	168.3	178.2	152.4	167.2	112.4
- Merchandise	32.0	48.3	48.3	44.0	31.2	36.2	37.6
Vessels	6.3	20.2	18.8	13.5	4.4	3.8	2.9
Equipment	8.1	11.5	12.2	13.0	8.8	11.2	16.4
Fuel	14.2	13.2	13.3	14.0	13.7	17.6	14.2
Other	3.4	3.4	4.0	3.4	4.3	3.6	9.0
- Services	134.0	127.3	120.0	134.2	121.2	131.0	74.8
Chartering	89.3	63.8	64.2	65.7	58.6	63.0	36.2
Salaries	12.0	16.0	19.6	30.6	30.5	34.6	24.8
Other (net)	32.7	47.5	36.2	37.9	32.1	33.4	13.8

Source: BCM and Bank/IMF(International Monetary Fund) estimates * Data on imports have been partially estimated and should be used cautiously.

1.75 The net impact of the sector on the current account varied from 40 percent to 50 percent of the sector's total receipts between 1986 and 1990, and is estimated to have fallen from US\$126 million in 1989 to US\$70 million in 1990 and US\$123 million in 1991. Operating costs are high: labor costs increased rapidly from 1987, largely because Korean fishing crews negotiated higher salaries after repeated strikes, and fuel oil costs remain high (US\$400/mt in Nouadhibou, compared to US\$100/mt in Las Palmas).

Budget Revenues

1.76 The share in budgetary revenues of taxes on fish exports and of fishing-license-penalty fees in budgetary revenues varied greatly during the early 1980s, before settling to about 19 percent during 1985-89 and to 20 percent in 1991. Taxes on fish exports grew at a compounded annual rate of 32 percent from 1980 to 1986, stagnated from 1987 to 1989, and fell by an estimated 12 percent in 1990, as shown in Table 7. Fishing-license payments-royalties declined in the early 1980s, before rising rapidly from 1987 as a result of the successive fishing agreements with the EC. While no data are available for other taxes (income, sales, petroleum products) paid by the fisheries sector, these are estimated at about 5 percent of total budgetary revenue, bringing the total share of the fisheries sector to about 28 percent of government revenues. A revision of the tax system is called for; a more consistent system of fees for licenses and quotas could replace the present fisheries tax system.

Table 7

Budgetary Revenues from the Fisheries Sector

	(UM m)						
	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
Budgetary Revenues including:	12301.0	13696.0	15782.0	16685.0	17834.0	15052.0	15515.0
<u>Tax revenue</u>							
Fish Exports	1850.0	2202.0	2059.0	2266.0	2367.0	1733.0	1910.0
<u>Non-Tax Revenue</u>							
Fishing-license & penalty fees	500.0	476.0	1166.0	1027.0	1231.0	1752.0	1245.0

Source: Ministry of Economy and Finance

Taxes and Duties

1.77 A complex set of export taxes and duties is levied differentiating between the processing site of products -- at sea, on shore, or as fresh product. There is no obvious case for charging differential rates of duty for the same species, using such criteria (see Annex 4, Table 4). See also para. 1.76.

Financial Performance of Private Companies

1.78 The financial performance of the private companies is shown in Table 8, for 1989-90. All the companies proved extremely vulnerable to a fall in production and were unable to cover their operating expenditures.

Financial Constraints

1.79 The fisheries sector was expected to be a major source of economic growth during the 1980s and 1990s, and to offer the greatest potential for increased employment and value-added, as well as for foreign exchange earnings and budget revenue. Its recent poor performance has implications for:

economic growth;

the balance of payments -- with exports value falling since 1988;

the budget -- with taxes on fish exports accounting for about 20 percent of total budgetary receipts; and

the banking sector -- with many outstanding bad debts.

Table 8
Income of Private-Sector Fisheries Companies, 1989-90
(UM)

	SOPECHE		SOMACOPP		MARITIME-UNION		ETS. SALEM		SMAIP	
	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990
Total production	484,720	377,756	606,932	463,313	361,303	527,402	464,707	401,975	410,923	348,949
Internal consumption	246,753	223,028	340,544	268,620	289,942	462,366	336,666	315,837	341,835	365,910
Income before depreciation & financial expenses	14,811	8,427	33,792	-11,845	25,304	-375	53,672	25,567	-2,289	-85,405
Income before depreciation & provisions	-14,520	-12,314	27,763	-32,568	23,507	-18,910	49,460	15,247	-14,395	-105,767
Operating income	-32,399	-20,460	26,913	-33,374	-651	-55,530	-8,647	-46,233	-62,279	-135,788
Income before tax	-32,399	-20,860	21,913	-33,625	-1,825	-63,163	-21,115	-2,360	-63,300	-147,295
NET INCOME	-43,161	-28,126	6,641	-43,221	-9,848	-74,875	-31,433	-12,284	-72,124	-155,526

Source: CRSP

E. The Structure of the Fishing Industry

1.80 From about 1979 when the Government required that fish caught in Mauritania' EEZ be landed in Mauritania, unique fisheries constraints have existed. In the absence of a maritime tradition, and given the lack of a comprehensive program for training local people, Mauritanian vessel owners found it necessary to employ foreign fishermen. The absence of adequate facilities for repair and maintenance resulted in dependence on foreign repair facilities (particularly in the Canary Islands), which greatly increased costs. A scarcity of management has hampered fisheries policy, strategy, management, and efficient industrial fleet and shore-based operations.

Industrial Fisheries

1.81 In accordance with various bi-lateral fishing agreements, financial compensation is paid to Mauritania by the fleets operating under the agreements for fishing licenses.

The Fishing Fleet in Mauritania's EEZ

1.82 At September 1991, 368 industrial fishing vessels were licensed or held permits to fish in Mauritania's EEZ; the number of vessels actually in operation was under 250. Industrial fishing is done from the Port of Nouadhibou, and there are three main types of licensed or permitted vessels represented in Mauritania's fisheries: foreign vessels holding a fishing license granted under a bi-lateral fishing agreement -- at the present time only the EC and Japan have such agreements; vessels chartered by Mauritanian companies; and Mauritania's national fleet. Both the latter types hold permits which are available only to Mauritians. These licenses and permits encompass all legal industrial fishing in Mauritania.

The EC Fleet

1.83 Within the overall framework of the EC agreement 74 fishing license applications by EC vessels were filed in September 1991. These were essentially for specialized fishing, such as: pole and line tuna fishing boats (Spanish, French), freezer tuna-seiners (Spanish, French), freezer shrimping boats (Spanish), hake fishing boats (Spanish), lobster boats (Portuguese), and icing longliner (Spanish).

The Japanese Fleet

1.84 This is made up of 14 freezer longliners.

The Chartered Fleet

1.85 This comprises 74 vessels operated by Mauritanian companies or joint venture enterprises. It has four main categories:

Pelagic freezer trawlers. These super-Atlantic type vessels are large 80-100m with 2,300-4,000 hp engines. There are 41 vessels of this type: they are operated by six companies:

MASPECO	2 vessels
MAUSOV	26 vessels
SIMAR	5 vessels
SITAC	3 vessels
SMAIP	3 vessels
SIPECO	2 vessels

Freezer bottom trawlers -- four of these trawlers are chartered by ALMAP (an Algerian-Mauritanian fishing company).

Icing (refrigerated) bottom trawlers -- there are ten boats of this kind. SIMAR charts four and SIPECO charts six.

Specialized icing (refrigerated) vessels -- there are 19 vessels of this type, employing pole-lines, longlines or gill nets.

The National Fleet

1.86 At September 1991, there were 165 registered vessels. Only half this fleet was operational. However, recent information indicates that, at May 1992, only 30 percent of this fleet was operational.

1.87 The freezer trawler fleet This is the largest. Of 116 vessels, it comprises 112 trawlers, 2 shrimping boats and 2 pelagic units, the latter 4 vessels being currently out of service.

1.88 At September 1991, only 57 vessels were in operation (49% of the fleet).

1.89 The refrigerated (ice) fleet This fleet is made up of 48 vessels, 45 of which are trawlers. These vessels are operated by three companies:

ALMAP	6 vessels
MABROUKA	9 vessels
SALIMAUREM	10 vessels

1.90 At October 1991 only 25 vessels in this icing (refrigerated) fleet was in operation.

The Operational Status of the Industrial Fishing Fleet

1.91 Severe constraints exist in the fleet operational area, among which are crew employment, port services, spare parts, docking space, and administrative delays. Ship owners calculate that such constraints add up to the loss of operation of 54 days/vessel/year -- the equivalent of at least one fishing trip.

1.92 The total CUE for the entire fleet is under 100 kg/hour, which may be contrasted with 1,482 kg/hour recorded in 1964 (the average CUE for the five year period 1964 - 1968 was 1046 kg per hour). Even at the end of the 1970s the CUE for cephalopods (see Figure 4) was four or five times higher than it is now (1991). These good fishing conditions led to wasteful management

practices and the neglect of vessel maintenance. Now that fishing is poor, these inadequate operating practices are difficult to correct.

1.93 The declining profitability of the cephalopod fleet has recently become a serious problem. This fleet's difficulties have been getting much worse in the last two years (1990-91).

1.94 The reasons for this are overfishing and poor operating conditions. In 1990 the CUE in the case of cephalopod species was 55 kg/hour for a total fishing effort of 368,000 hours. This is well below the fishing effort threshold for a well-managed stock.

1.95 Table 9 shows the decline in fleet operations in the period 1987-1990 (based on a constant fleet).

Table 9
Fleet Operating Indices
1987 -1990

Index	Percent Decline
Number of fishing days	21.5
Cephalopod catch	39.6
Total catch	36.0

Source: WB; Mauritania Statistical Data

1.96 The fleet's declining efficiency is clear. This is particularly evident in the large vessels, involving, as it does, the use of inefficient vessels, the considerable age of this fleet, the minimal maintenance carried out, often causing technical stoppages, and the lack of experience of some operators.

1.97 A study conducted on a sample of 75 vessels revealed that:

Most of the vessels had reached the limit of their economic life;

Many of the fishing companies were not in a position to replace their investments; and

The profitability of the vessels was often achieved at the expense of maintenance and depreciation allowances.

Artisanal Fisheries

1.98 This sub-sector has created employment and income for 2 to 3 thousand Mauritians. The main drawback it has faced is having to compete with the industrial fleet for the same species, in the same fishing zones. This contributes to the overall decline in CUE. (No distinction between artisanal and small-scale industrial fishing is made in this discussion.)

1.99 Considerable public emphasis has been placed on the development of artisanal fisheries. The Declaration on Fisheries Sector Policy accords an absolute priority to the development of artisanal fisheries (Article 33), and outlines some of the related needs, such as exclusive fishing grounds for artisanal vessels, improvement and modernization of fishing vessels, provision of financial resources for small-scale fishermen, training, and the development of infrastructure such as port facilities. According to the policy statement, all internal price controls were to be lifted, and the export of products outside the control of the SMCP were to be liberalized. To date the Government has been slow to implement this policy.

1.100 An artisanal fishing vessel is defined by Decree No. 89.00 of July 26, 1989 as "a boat using a fishing technique other than trawling, having no deep-freeze facilities, and equipped with a motor, if applicable, of a continuous speed no greater than 200 hp." But most artisanal fishing vessels in Mauritania are large canoes (pirogues), many equipped with outboard motors.

1.101 The MPEM estimated the total number of artisanal fishing vessels at 798 in February 1991. Of these, 422 (53 percent) are based at Nouadhibou, 184 (23 percent) at Nouakchott, and the remainder at various locations along the coast. Of the total, 695 are considered operational.

1.102 The MPEM estimated the number of artisanal fishermen at 3,620 in February 1991. This increase by comparison with the number in August 1989 (2,236) is attributed to new recruitment from the interior and some returns from Senegal. The majority of these (55 percent) are based at Nouadhibou, with 21 percent at Nouakchott.

1.103 The artisanal fishing fleet is widely dispersed and poorly documented; its catch was estimated at 13,000 mt in 1990 and 18,000 mt in 1991. The catch was probably somewhat less for 1988 and 1989, due to the departure from Mauritania of large numbers of Senegalese fishermen.

1.104 Artisanal fishing vessels use a variety of fishing methods, among which are the gill net ("filet dormant"), the seine, the long line ("palangre"), and the octopus pot ("pot de poulpe"). The latter was developed in recent years at Nouadhibou, and is said to be profitable.

1.105 Table 10 shows the variety of species caught by artisanal fishermen, and gives an estimate of the scope of landings.

Table 10
Annual Landings of Fish by Artisanal Fishing Vessels
at Nouadhibou and Nouakchott (mt)

Species	1988		1989	
	Nouadhibou	Nouakchott	Nouadhibou	Nouakchott
Musetellus	555.9	-	918.7	-
Courbine	163.3	4,820.0	404.4	3,326.2
Mullet	540.9	904.8	17.2	272.0
Sardinella	55.4	2,764.0	14.9	1,486.6
Sole	5.2	155.7	49.2	-
Dorade	19.0	-	26.2	-
Lobster	97.0	7.2	116.0	2.6
Sparidae	23.5	-	107.1	-
Diagramme	254.4	-	123.2	-
Octopus	2,487.7	-	3,644.7	-
Other	1,348.8	8,650.0	1,356.4	1,732.5
Total	5,555.1	17,301.7	6,778	6,819.9

Source: CNROP, "Report on the Situation of Maritime Fishing and Recommendations," January 1991, Tables 9 and 10.

1.106 Compared with 1988-89 for both the Nouadhibou artisanal fleet and the industrial fleet, 1990-91 were poor years, with a substantial decline in the recorded catch of octopus.

SPPAM

1.107 The Company for the Promotion of Artisanal Fisheries in Mauritania (SPPAM) established as a cooperative in 1983 with the assistance of the Danish International Development Agency (DANIDA), has some cold storage facilities (800 t store), but the company has a generally worsening history of losses, and its financial and operating management is extremely poor (see Annex 3, para 3). It would not be prudent to look for leadership from this institution.

1.108 Most artisanal fisheries activities in Nouadhibou are financed by two private companies.

Artisanal Fisheries Marketing

1.109 In most countries cold-storage facilities are adjuncts to the fish trade, not stand-alone businesses, and this seems to be the case in Mauritania. In Nouadhibou, the artisanal fish-processing sector is involved in the purchase of fresh octopus, which is then sorted and frozen for sale. Given the excess cold-storage capacity in Nouadhibou, the question arises as to why small-scale operators choose to have their own facilities. There seems to be concern about loss of confidentiality and interference with the product (theft). There is also a risk of non-availability of storage space and the inconvenience of transport to the cold stores. There clearly is a cost in the duplication of freezing and cold-storage capacity.

1.110 The MPEM reports that except for SPPAM, there are nine establishments in Nouakchott with cold-storage capacity suitable for fish. The total cold-storage capacity of these is estimated to be 456 tons, including 12 tons of freezing capacity and 150 tons of chill-storage capacity. It is also reported that existing capacity is under-used because of the absence of a suitably priced supply of

good-quality fish. There is an active domestic fish trade from Nouakchott by small-scale fish merchants. Fish is sold in Nouakchott: some is taken into the interior in small trucks.

1.111 In Nouadhibou, there are five establishments geared to serving the artisanal fishing sector. Altogether, they have about 50 tons per cycle of freezing capacity, 410 tons of cold-storage capacity, and limited chill-storage capacity. One company reported that the combination of relatively low seasonal supplies of octopus, together with depressed international prices, made the operation unprofitable -- an opinion confirmed by the company's cash-flow statement. The same company also provides loans to fishermen to cover operating and domestic expenses.

Artisanal Fisheries Credit

1.112 For small-scale fishermen without significant assets, access to credit is always a problem. Where credit systems have been established, it has often proved extremely difficult to maintain repayments. To run a successful fishermen's credit system requires continual, close, professionally informed supervision of the operators, inevitably, incurring a higher cost than for operating a conventional credit system.

Future Development in the Sub-Sector

1.113 Three factors should be noted in respect to any future development of the artisan sub-sector:

There are limits to the development of strictly artisanal, nonindustrial fisheries; this sector's landings will always be low compared to the overall potential of Mauritania's EEZ;

In opting for the fresh fish rather than the frozen fish sector, there are more serious constraints involved; and

The demersal resources primarily fished by the nonindustrial fisheries sector are not coastal biological stocks. They are fished by the entire fishing fleet, both industrial and nonindustrial. Their present status and any resource management policy that is to be implemented will have a major impact on both sub-sectors.

F. Fish Marketing

1.114 Between 1987 and 1991, all fish marketing functions in Mauritania were a state monopoly, except those carried out by small-scale artisanal fishermen, and the transshipment of pelagic fish via the Nouadhibou harbor.

1.115 The Société Mauritanienne de Commercialisation du Poisson (SMCP), the Marketing Board and a Consultative Board set up within the framework of SMCP are designed to provide a focus for input from various sectors of the industry, but are highly bureaucratic and do not appear to function well. Before 1991 SMCP was a trader in fish, but the Government moved to arranging fish

sales directly between ship owners and buyers. Its income is supposed to be derived solely from commissions on the sale of fish; fish sales are credited directly to vessel owners. The owners are not comfortable with these new arrangements, and both parties are experiencing difficulties with the transition. The Government is attempting to adjust the function of the various marketing bodies to accommodate the recent changes in the sector, but is facing many uncertainties and difficulties.

Mauritania's Export Markets

Pelagic Fish

1.116 In 1991 the bulk of pelagic fish was caught by the Atlantic and super-Atlantic vessels leased by MAUSOV, SIMAR, and the EC. The catch (horse mackerel, sardines, and sardinella) is frozen into blocks of whole fish, or small amounts are canned, and larger quantities are turned into fish meal and fish oil. All MAUSOV's canned, meal, and oil output, together with 80 percent of its frozen fish, was sent to the USSR, which was supplied by the numerous Soviet fleets operating all along the West African coast and in the South Pacific, particularly off Peru and Chile. This was a captive market, supplied exclusively by the former USSR. Prospects for finding alternative markets for these species are not bright. For example, SIMAR had to struggle to overcome the difficulties of selling the catches from the fleet it leases from Romania in West African markets, such as Nigeria, Côte d'Ivoire, Ghana, and Cameroon.

1.117 Mauritania is now in a poor marketing position, since its former partner, the USSR, controlled its own market.

1.118 The changes in Eastern Europe impose major uncertainties on the future of this fishery. Markets for small pelagics and mackerels are declining and prices are low. But international markets might improve because of the expected upturn in economic conditions in West Africa and the increase in the price of fish meal. Algeria obtains a modest amount (40,000 mt) of fish meal per year from Mauritania through its partnership in ALMAP.

Frozen Whole Fish for West Africa

1.119 Nigeria and Côte d'Ivoire are the two main West African markets for frozen pelagics. In 1981, 530,000 tons were imported by Nigeria and 130,000 tons by Côte d'Ivoire. Since 1983, these amounts have fallen. SIMAR and SMCP have attempted to sell pelagic fish and "poisson d'Afrique" in these markets, but have encountered many difficulties because of low prices and the lack of necessary foreign exchange.

Dried and Salted Fish for the African Market

1.120 Mauritania has traditionally exported relatively small amounts of salted dried fish to other African countries. Nigeria, Togo, Congo, and Gabon constitute the most important markets in Africa for these products.

Demersal Fish

1.121 The main demersal species caught in Mauritanian waters are bream, sole, crayfish, grouper, "danton", and croaker. The main buyers were Western European countries mainly Italy, Spain and France. A distinction can be drawn between captive markets which are supplied by fleets owned by joint ventures (the market constituted by the country's foreign partners -- the USSR, Romania, Iraq, and Algeria) and world price markets such as Japan and Southern Europe.

Cephalopods

1.122 Japan, Spain, and Italy are the world's largest import markets for cephalopods, and are also Mauritania's main buyers. Before SMCP was established, most cephalopods caught in Mauritania were marketed by well-established traders in Las Palmas.

Other Market Possibilities

1.123 Mauritania should study the financial and economic costs and benefits of entering into trade agreements to sell fish under preferential conditions to European countries, as well as countries such as Egypt and Nigeria. This might provide an opportunity for supplying, in various forms, frozen products prepared in the Nouadhibou plants, thereby increasing value-added, creating jobs, and raising export earnings. It would be highly desirable to obtain the cooperation and assistance of the UNCTAD/GATT International Trade Center in Geneva.

G. Fish Processing

Processing

Cold Stores and Freezing Plants

1.124 There are eight industrial plants in Nouadhibou for processing, freezing, and storing fish. These were built, with a few exceptions, between 1980 and 1985. Most are owned by or affiliated with their own fleets of wet-fish and freezer-trawlers, and most of the facilities are owned by the Mauritanian State or jointly by the State and a foreign country. One plant is privately owned: two others are leased by private companies.

Table 11
Industrial Processing Plants
(estimates)

Company	Main Characteristics			Production
	Freezing mt/8 hr	Ice mt/24 hr	Cold-storage mt	1990 mt
SIPECO	50	30	1400	1200
SALIMOREM	50	25	4000	1100
SMEF	0	0	5000	0
COMACOP	60	20	6000	N/A
MAUSOV	0	0	3000	0
ALMAP	20	20	1200	3000
SINAR	35	N/A	1800	N/A
SCAND./MAUR. FISHING *	35	N/A	1800	N/A
TOTAL (ca.)	250	95	24200	7000

* Inoperative
Source: WB

1.125 It is debatable whether all the existing freezing capacity is necessary. There are two peak seasons in the year: November to January for octopus, and June to July for fish. Only during these periods is there capacity use.

Processing Plants

1.126 The shore-based processing plants are divided into two main groups: four small plants concentrating on processing fish from the artisanal fleet and five larger ones processing from both the artisanal and wet-fish fleets. Only a few companies process value-added fish (fillets, squid rings).

1.127 The processing industry in Mauritania is primitive. The processing equipment used is obsolete; products are weighed with manual scales, resulting in fluctuations in the weight of blocks or cartons; freezing pans are obsolete (this also applies to the on-board processing fleet), which is a

major deterrent to efficient handling of the product. Hygienic conditions, as well as construction details, are not in keeping with international expectations.

1.128 Some examples are:

The outside of plants is not covered with concrete or asphalt;

There are no separations (walls) between the different areas of processing halls. These generally consist of one large room where diesel-driven forklifts are operated alongside laborers handling finished products;

There is free access into the buildings;

There are no airlocks, and in many cases, no shields, between processing areas and the outside;

Floors are generally defective and lack adequate drainage;

There are sharp corners between floors and walls;

Facilities for personnel (toilets and dressing rooms, for example) are below standard;

Workers were dressed in their own clothing, instead of clean, white overalls; and

Workers sat in the sand outside during breaks and brought sand and dirt back in with them.

1.129 Knowledgeable observers of the processing industry see a great need for practical courses in processing methods, for improving product quality and securing and maintaining hygienic management.

1.130 The standards normally applied to food-processing plants were ignored when plants were being designed and built in Mauritania. This is particularly so with regard to the SPPAM project in Nouakchott. The processing areas in these plants would not be approved by the EC, Japan, or many other countries.

1.131 The small plants appear profitable; the larger ones do not. The material provided indicated that the procedures were not those used in developed fishing industries, particularly with respect to the methods for calculating the contribution of different products to fixed costs.

1.132 Seven separate companies were operating cold stores within a limited area, most of them with half-empty chambers. The majority are owned by parastatal companies. Substantial savings could be realized by closing some of the less efficient companies, so reducing overheads and operational costs when demand for cold storage space is at a minimum.

Constraints for Canning Fish

1.133 Various proposals to build a canning industry have been discussed. But the industrial production of canned fish does not appear to be warranted at this time because production costs of canned pelagic species (horse mackerel and sardines) are high in Mauritania, and prices for these products are low. It would be very difficult for Mauritania to compete with large producers such as Japan and Peru.

1.134 There are large markets for canned pelagic fish in Indonesia, Singapore, Malaysia, the Philippines, Papua New Guinea, Egypt, and Nigeria. But Japan is the main supplier for all these markets, at an average price of US\$17 per case of 48 x 425g. The production and processing costs involved in canning small pelagic species, plus the requirement to import the tin plate for cans or the cans, would make it difficult for Mauritania to become competitive internationally.

H. Port and Harbor Infrastructure

Port and Harbor Infrastructure

1.135 Port infrastructure in Mauritania exists only in Nouadhibou and Nouakchott. The coast of Mauritania is shown in Map IBRD 22261.

1.136 The Port Autonome de Nouadhibou (PAN) operates under the authority of the Ministry of Fisheries. It is located in Cansado Bay; the port has a commercial wharf some 8 m deep and 117 m long, used for the import of consumption goods, fuel from NAFTAL, the export of frozen fish, and for supplying fuel and water to vessels. The fish wharves, totalling about 600 m in length and with a water-depth of some 6 m., are used for unloading fresh and frozen fish, and for loading frozen fish into smaller freighters.

1.137 Some 70,000 tons of fuel are unloaded yearly at the commercial wharf. Gasoline is brought to the port by truck. Water and power are supplied to the port by the city, and reportedly, there is no shortage or interruption in the service of either. About 5,000 tons of ice, produced at two factories (see Annex 6), are provided yearly to the fishing vessels by conveyor belt.

1.138 The wharves, sidewalk, and water/fuel supply outlets badly need repair. The Caisse Centrale de Coopération Economique is considering financing at least some of these repairs. The port owns no tugs; the only two available in the area belong to the Mauritano-Saudi Ship-Repair Facility, which rents them out.

1.139 Cargoes and profits have decreased over the last two years, most probably as a direct result of the fall in the volume of fish unloaded and loaded at the port. But expenditures have continued to rise, independently of revenue generated. If no cost control is exerted to increase efficiency, and if tariffs are not increased, the port operation will cease to be profitable very soon.

1.140 A new master-plan for the port is being prepared, including extension of the commercial wharf, demolition of the present mini-container terminal and erection of a new one, and extension of

the fish wharf. Any such plan should take into account the status of fisheries resources and their future prospects.

SNIM Port Facilities

1.141 In 1990, 170 vessels were loaded, and in 1991, up to October, 110 vessels were handled. On the average, vessels have to wait three days, at a demurrage cost of US\$10,000 per day, paid by the SNIM (the iron ore company). Vessels sometimes take in water, but never fuel, which is expensive. Loading takes two to three days, the ship-loader has a maximum nominal loading capacity of 50,000 mtpd, and the average loading rate is about 30,000 mtpd.

Industrial Fisheries Port of Nouakchott

1.142 Along the southern part of the Mauritanian coast, port facilities exist at two locations, both near Nouakchott: the wharf and the Port de l'Amitié. The first is an old, unprotected, open-piled structure not suited for present-day cargo handling. The second is an open-piled access bridge to a detached breakwater, protecting a commercial wharf on the inner side. Of the two, only the facilities at the Port de l'Amitié can be seriously considered.

1.143 Following the proposed strategy to develop two industrial fisheries ports in Mauritania, the site for a second facility at the Port de l'Amitié should be selected. In general, the whole coast south of Nouadhibou presents the same adverse conditions: waves all year round, mainly from the north-west; no natural protection from the waves; and littoral drift (sand transport) to the south.

1.144 Protection of port facilities by breakwaters is essential. Since the investment required for breakwaters is very high, it could be justified only if all potential port-users unite, but with each having its separate facilities.

1.145 This already built port is the only logical site to develop a fisheries port, making use of the protection offered by the existing breakwater and generating more benefits to the total port complex, at a relatively modest cost.

Artisanal Fisheries Facilities

1.146 North of the wharf, the substantial artisanal fishery activities can be incorporated into a new port. Building landing facilities for only the artisanal fishermen, either on the open coast (open, piled jetty) or, as proposed in earlier studies, in the lee of the Port de l'Amitié, would not be viable economically or financially.

Artisanal Beach Landings

1.147 Artisanal fishermen land their fish at the Baie de Repos, just north of the PAN. Tendering is underway for the construction of an artisanal fisheries port at this site. The projected investment of some US\$10 million appears far too high for such a facility.

Oil Supply Facilities

1.148 Under an agreement with Algeria, a refinery was built just north of the SNIM to supply Mauritania with oil products. The agreement is due to expire in 1992, and negotiations have commenced on its renewal.

1.149 The refinery has an installed capacity of some one million tpa of crude, but at present refines only approximately 300,000 tpa. The imbalance between its production and demand by the Mauritanian economy, is shown in Table 12 below.

Table 12
Refinery Production and Demand

<u>Product</u>	<u>Demand (%)</u>	<u>Production (%)</u>
LPG	3	3
Kerosene	7	7
Gasoil	59	46
Gas	11	21
Fuel	20	23

1.150 If the refinery fulfills the Mauritanian demand for gasoil, it will have a surplus of all the other products, which would have to be exported. Since the quantities involved are small, this would be expensive. Production is probably set to roughly satisfy the demand for most products except gasoil, while some gasoil will have to be imported and a certain amount of gas will have to be exported. Reported shortages of gasoil and delays in importation are most probably related to this.

1.151 Crude oil is shipped from Algeria in 50,000 dwt tankers to the refinery; oil products are shipped in a chartered 5,000 dwt product-carrier. The latter is fully employed in Mauritania, and makes two trips to Nouakchott and two trips to the PAN every month. Total gasoil transported is of the order of 5,000 tpm.

1.152 The refinery produces its own electricity. It has an installed capacity of two 6.4 mega watt power plants, of which only one operates at a time. The refinery is not operating at a profit.

Ship-Chandler Services

1.153 So far ship-chandlers services at Nouadhibou have not been satisfactory. Several ship-chandlers handle small volumes of a wide variety of products for provisioning. But the ship-chandlers have significant delays in delivering orders, and the prices are routinely higher than in Las Palmas. Occasionally the final price for orders placed by shipowners is prohibitively expensive. The entire ship-chandling system should be reorganized with the establishment of specialized storehouses by type of product, so that items required could be procured without going through several

middlemen, and with discounts for volume purchases. There should be a system for financing and transfer of payments abroad to provide working capital and foreign exchange for the specialized ship-chandlers.

Ship-Repair Facilities

1.154 The Mauritano-Saudi Ship-Repair Facility (MASHREF) operates a floating dock installed in 1989. It is located at the inner side of the PAN commercial wharf, with workshops onshore.

1.155 The investment is reported to have been US\$5 million. Two tugboats and a pontoon are on lease. Ownership is shared, with 50 percent held by private Saudi interests, 35 percent by private Mauritanian interests, and 15 percent by the Mauritanian Government.

1.156 In 1990, some 105 vessels were docked, at a turnover of US\$4.5 million, with a 15 percent profit margin.

1.157 One floating dock is depreciated over a 10-year period. A services agreement exists with the builder of the floating dock, while credit lines with suppliers of spare parts are claimed to be available. The other floating dock available at the port belongs to the PAN and is rented to shipowners who can carry out their own repairs.

1.158 At present, one 62 m vessel or two smaller vessels up to a maximum of 1,000 dwt can be docked. Plans are ready for the construction of a shiplift with parking slots for vessels up to 1,000 dwt and possible expansion to 4,500 dwt later. Six potential sites to locate the shiplift and repair yard have been studied, the preferred site being at the PAN and the second choice at another site. The required investment was quoted as US\$27 million, including US\$8 million for equipment.

1.159 The MASHREF has long-term plans (still being developed) to build ships in two sizes: 1200 hp freezer-trawlers, 40-42 m long, and 800-900 hp ice-trawlers, 29-30 m long. Considering that the fishing fleet which should operate in Mauritania should comprise far fewer vessels than now operate, it would appear prudent to scale proposed investments in vessel repair and construction facilities to lower catch levels and smaller vessels.

1.160 The MASHREF charges higher fees for its services than other comparable repair facilities in Las Palmas. Since this is a commercial operation, prices should be established on market conditions, provided there are no restrictions on shipowners' using the Las Palmas facilities, so ensuring fair competition. The MASHREF should not be allowed a monopoly.

I. Fisheries Management

1.161 Fisheries professionals have long known that many, if not most, of the fisheries of the world were being fished at or near their biological limits by (overcapitalized) fleets using far too much fishing effort. This has wasted biological and financial resources.

1.162 Better management has been advocated, but it has seldom been adopted unless the political and economic costs of not adopting it are clear to Government, fishermen, processors and the public. Some cases in which management has been adopted involve a clearly failing fishery and the imminent prospect of the economic collapse of an important industry.

1.163 The declines in catches and revenues in Mauritania are early warning signs of the structural disruption which may be caused by a complete failure. If the present system is not effectively amended in harmony with the economic and biological conditions of Mauritania, serious financial and societal costs will be incurred.

1.164 To grasp the ideas which underlie fisheries management, some economic principles are important. When exploitation of a fish stock begins, yields rise rapidly in proportion to effort. In mid-phase of the fishery, yields relative to effort begin to level out. In the fully mature or over-harvested phase, yields begin to fall in proportion to effort. An introduction to such principles is found in Annex 2.

Fisheries Management in Mauritania

1.165 Mauritania has had in place some elements of the system needed to manage its resources, a competent fisheries research institute for collecting information about the fisheries resources, a partial system of fisheries surveillance and control, and seemingly adequate laws and regulations to control fishing. Nevertheless, the results have been disappointing.

1.166 The present management regime of the Government has been unable to maintain the resource base at a level adequate to provide for a viable fishing industry suited for the future needs of the country. The discussion in Conclusions and Recommendations as well as those in Annex 1 should be seen as a starting point leading to substantive changes in Mauritania's management practices, harvesting patterns, and revenue generation. A more comprehensive system of insuring the benefits from the fishery should be implemented, similar to those successfully implemented in Iceland and New Zealand, specifically the development and implementation of a Fisheries Management Regime (FMR).

Fisheries Management Regimes (FMR)

1.167 FMR refers to an overall institutional framework. It may be austere or complicated. It may embrace one or many institutes, ministries, agencies or bureaus, but it must embrace all management institutions related to the fisheries. An outline of the FMR and its subsystems, which is intended only to provide examples, is shown in Figure 8; Annex I contains additional information. The regime consists of three elements:

A Fisheries Management System (FMS), that sets out rules for conducting fishing;

A Monitoring, Control and Surveillance (MCS) System, that monitors fishing activities and enforces fishing rules; and

A Fisheries Judicial System (FJS), that complements the MCS and ensures adherence to the overall management system.

1.168 The components of the FMR would be established by national legislation and are strongly interdependent. For example, the fishing rules specified by the FMS define the scope of MCS activity as well as the focus of the FJS. The operations of the MCS activity place demands on the FJS, and both activities suggest any needed changes in the FMS.

1.169 Each component is crucial for the success of the FMR. To obtain full economic benefits, all three components must be appropriately designed, well coordinated and highly functional. This suggests that for most circumstances a single entity should oversee the FMR as a whole and coordinate its components. Without this guidance the social and economic benefits of such a system could easily be dissipated.

1.170 Any such system must be designed with the needs, aspirations, and cultural, social and political framework of the country at the core of the design. It should be clear that the process would require considerable effort and time.

1.171 We are mindful of earlier attempts of the Mauritians to place one agency in control of the fisheries sector, with apparently strong political opposition to such measures. Perhaps a consultative approach to define the vital interests of the various parties involved could reach consensus on the way in which future fisheries management should be carried out.

Figure 8

**Indicative Outline of a FMR Providing Examples
of
Some Functional Roles for the Components**

National Legislation Establishes A Fisheries Management Regime (FMR)		
Fisheries Management System (FMS)	Monitoring Control and Surveillance System (MCSS)	Fisheries Judicial System (FJS)
Regulatory Framework: Examples; Fisheries Regulatory Agencies	Enforce FMS: Examples; Sea, Air and Port Patrols	Establish Sanctions: Examples; Fisheries Courts
<ul style="list-style-type: none"> ● issue licenses 	<ul style="list-style-type: none"> ● monitor vessel position 	<ul style="list-style-type: none"> ● try fisheries cases
<ul style="list-style-type: none"> ● regulate catch quotas 	<ul style="list-style-type: none"> ● monitor gear use 	<ul style="list-style-type: none"> ● fine violators
<ul style="list-style-type: none"> ● set vessel size restrictions 	<ul style="list-style-type: none"> ● monitor licenses 	<ul style="list-style-type: none"> ● issue judgements
<ul style="list-style-type: none"> ● determine gear restrictions 	<ul style="list-style-type: none"> ● apprehend violators 	<ul style="list-style-type: none"> ● seize vessels
<ul style="list-style-type: none"> ● set area restrictions 	<ul style="list-style-type: none"> ● issue citations 	<ul style="list-style-type: none"> ● revoke licenses

Source: WB

Ecosystems and National Boundaries

1.172 Fish do not respect national boundaries; they frequently overlap and often cross political boundaries. Resource management programs must address the complexities of the geopolitical arena. Any strategy to manage stocks often must do so in a multi-country or regional context. Devising regional strategies which will accommodate existing bilateral arrangements or previous understandings among neighboring countries is difficult. Developing mechanisms to deal with regional organizations, set up to manage shared resource concerns, becomes a real challenge for all parties. But the difficulties must not be used as an excuse for not attempting to manage national fisheries resources in the best way.

Catch Potentials and Ceilings

1.173 Several studies⁸ have attempted to suggest guidelines for catch ceilings. One difficulty may well have been the concept of catch potentials. By the time the guidelines were published, the potentials had already been exceeded and efforts to "reach" the potentials became counterproductive because catches were on the decline side of the catch-per-effort curve (see Figure 4, and Annex 2).

1.174 Demersal Stocks The mission believes that CNROP, possibly with the assistance of FAO or consultants, could provide working levels of catch ceilings (and effort ceilings) of sufficient precision to limit catch and effort to satisfactory levels. By using these limits, Mauritania could begin to rebuild demersal stocks on the continental shelf of Mauritania.

1.175 Pelagic Stocks The main pelagic stocks are highly migratory and agreement would have to be reached with the countries which share these stocks. The stocks are being harvested, primarily by vessels from Eastern Europe, and the near future course of these fisheries is not clear. The mission believes that no immediate attempt to manage the fishery for pelagic stocks should be made. We do recommend that a total ban be enforced on the fishing of larger pelagic freezer trawlers within 70 nautical miles of the coast of Mauritania to prevent these vessels from fishing for demersal species.

Allocation

1.176 Setting up a system of allocating fishing effort once the level of effort is determined is not an easy task, and it must be done with the cooperation of the fishing industry. Many options are available for setting up allocation systems, and Mauritania should make every effort to secure the best possible specialist advice.

1.177 In addition to limits on vessel types and gear, area restrictions, target species and by catch limits, most allocations systems tend toward granting a form of recognizing exiting tenure to operators. Examples are Individual Transferable Quotas or ITQ's, long-term lease rights to certain areas or species with gear limits.

8. (a) Les Ressources Halieutiques de la Zee Mauritanienne: Description, Evaluation et Amenagement. République Islamique de Mauritanie: Ministère des Pêches et de l'Economie Maritime. CNROP/FAO/ORSTOM, Rome 1989. (b) Mauritania: Fisheries Development and Management Policy in the Exclusive Economic Zone. Technical Cooperation Program. FAO, Rome, 1981.

1.178 Among the options, an open auction system could be designed, set within the strictly regulated guidelines of an FMR, using such factors as, for example, total effort, vessels and gear, species and area.

1.179 Bidding could take place on the basis of guaranteed payments to the Government of a mix of foreign exchange, taxes, levels of local employment, levels and types of local investment in plant and equipment to provide value-added and similar types of criteria. "Warrants to fish" could be issued for fairly long periods to encourage conservation of the resources. The warrants could be withdrawn if breached.

1.180 Systems similar in concept exist in the natural resource areas of mineral exploration and extraction and in the petroleum industry. They have the advantage of being "transparent" and relatively easy to administer. However, it would require great care, an excellent knowledge of Mauritania's fisheries and a disinterested party to design a workable and fair system.

II. Mission Conclusions and Recommendations

2.1 Mauritania faces serious problems in the fisheries sector. Catch and catch-per-effort have been steadily declining. Outstanding credit for fishing vessels is high and repayments are low. The fleet is poorly maintained and deteriorating. World prices are low and markets uncertain for small pelagics which are the basis for much of the Eastern European fishing effort in Mauritania. The relationship in the sector between Eastern European countries and Mauritania will certainly change in unpredictable ways. The shore-based processing and marketing of high-quality species would not meet international standards, and prices would be low.

2.2 The mission believes that key priority actions would define a strong fisheries sector strategy. The actions must be based on policies to which the Government has made a strong commitment. Well-conceived action concepts and designs must be prepared.

2.3 The actions are designed to further the following policy objectives: halt the trend toward serious over-harvesting and over-investment in fleet and other infrastructures; develop a fisheries management regime suited to the fishery resource and economic circumstances of Mauritania; increase the role of the private sector and confine the role of government to non-commercial support activities; improve the output of high-quality fish products to secure better markets and prices; strengthen the credit system for fisheries; develop programs for alternative employment; and seek donor support for technical assistance.

2.4 The mission recommends that the Government of Mauritania make a commitment to:

- radically reduce the total catching power of the demersal fleet (including any proposed additions), and institute, with the assistance of CNROP, interim fishing quotas for demersal fishing, primarily for cephalopods, until an adequate FMR is established. Such actions could be taken at once on the basis of existing knowledge, by means of guidelines (species: areas; vessels: number, type, size; gear: type, specifications) developed by the CNROP. CNROP should request assistance from FAO to convene a stock advisory panel to evaluate the current state of stocks and to present their findings in a way that could be easily understood by any well informed layman. The actions recommended here should not await the findings of such an advisory panel;
- design and implement an FMR, encompassing an FMS, an MCSS and an FJS. This would assure a healthy fisheries industry for the foreseeable future if implemented soon, in regard to demersal species and later, with the cooperation of neighboring states, in regard to pelagic species;
- seek an immediate review, by a disinterested third party, of the future prospects of the fishery for small pelagics, with relevance to the changes in Eastern Europe, particularly regarding markets and prices;
- ban fishing by pelagic freezer trawlers within 70 nautical miles of the coast of Mauritania to prevent these vessels from fishing for demersal species;

- enforce national and international regulations on the marking of fishing vessels. All fishing vessels in Mauritania's EEZ should display a national flag and display numbers in accordance with regulations;
- open the capital of Société Mauritanienne pour la Commercialisation des Poissons (SMCP) for investment by private sector processing plant, ship-owners and national banks. Private Sector ownership should be sufficient to allow SMCP to operate independently and efficiently, but allow the Government some degree of oversight. The restructured SMCP would provide a single and efficient export marketing channel for fisheries products and would at the same time ensure that foreign exchange earned by the fisheries sector is repatriated and that taxes are collected;
- attract an experienced foreign partner to establish the framework for a private sector quality inspection and control system for seafood, to secure better export prices and create a mechanism to issue certificates of quantity and quality of cold storage inventories as security for short-term working capital loans from commercial banks;
- assist the private sector in preparing investment projects by means of a donor-supported, demand-driven, well-staffed project preparation facility, taking into account the need to integrate these efforts with changes in credit terms and availability in the banking sector;
- establish credit policies that would require: borrower creditworthiness; substantial equity participation; and provisions for adequate collateral. Proven experience in the fishing business, no convictions for fishing violations, a history of keeping a well-maintained vessel, and compliance with regulations on vessel markings, safety, quotas, should be taken into the decision to lend;
- identify alternate employment opportunities. Implementing some of these recommendations may result in employment dislocation among Mauritanian workers; and
- seek donor support for technical assistance to implement these recommendations, particularly in, but not limited to: planning, establishing and implementing an FMR; developing a high-quality private sector fish processing industry; establishing a unit to assist in the preparing private sector investment projects; assessing the future of the pelagic fisheries, and identifying alternative employment opportunities and training requirements for the sector.

What actions should be taken in the short- and medium-term to implement the mission recommendations?

2.5 In Annex 6 lists the mission recommendations in the form of an Action Plan which integrates policy and technical recommendations and indicates a suggested time frame.

Other Technical and Sectoral Recommendations

2.6 The Economic and Financial Recovery Program (PREF) and the Program for Consolidation and Growth (PCR) stress the goals of economic efficiency and productivity, along with structural adjustment. The sectoral strategy in both the PREF and the PCR, aimed at modernization to achieve a sustained growth rate and a satisfactory increase in domestic added-value, originally included seven priority components⁹, which are reflected, with some amendments by the mission, to accommodate its findings. The mission believes, that the strategy is sound and that the recommendations form a suitable conceptual framework for future development.

2.7 The recommendations on the technical issues formed the basis for a Mission Aide-Memoire discussed with and agreed upon by Government in December 1991. The details of these are found in Annex 6.

9. Research, surveillance, small-scale fisheries, integrated cold chains, industrial fisheries, training and employment, increasing government revenues from the sector.

III. Government Proposals for Investment

3.1 The mission has reviewed the Government's proposals to realize an increase in national benefits from the fisheries sector. Important investments are needed by the public and private sectors at all levels -- including fish production (strictly within guidelines for lower levels of total fishing effort), processing, marketing, infrastructure for artisan fisheries and research, training and development.

3.2 Fish harvesting requires careful investment in trawlers, engines, and nets for fish catching, and the development of ports, piers, and landing sites. Fish processing and marketing require plants, cold storage, ice plants, refrigeration facilities, insulated transport facilities, and wholesale and retail fish markets. Access roads to bodies of water and fish-landing centers are needed. Training opportunities and facilities, fishery research stations, and fisheries training and extension facilities are all needed to make the transition to quality products that the international markets require.

3.3 Substantial growth in incomes from modern marine fisheries could be made possible by: appropriate public sector investment and transfer to the private sector of the responsibility for fish-harvesting, processing and marketing technology; expanding the domestic and export demand for fish; and securing the highest possible international prices for high-quality fisheries products. The public can participate in transferring technology, providing incentives, and creating infrastructure to facilitate private sector presence in the fisheries sector. However, public investment has been, and is expected to remain, very low, as World Bank (1991) estimates, summarized in Table 13 show.

3.4 The present study indicates that it will not be possible to maintain the 1986/87 level of fisheries production. A program to improve post-harvest handling and more effective management of the marine fisheries has the greatest potential for increasing incomes and decreasing dependency on inputs from outside Mauritania. This program, in combination with investment in infrastructure, offers the best opportunity for meeting the sectoral objectives. It represents the most effective means of meeting sector goals for increased export earnings, employing as much as possible of the large capital investment already made in infrastructure, and processing facilities. Reduced reliance on distant water fisheries should result in decreased dependency on fossil fuel and other imported inputs and generally reduce operating costs. The resulting shorter fishing trips, in combination with improved product handling, will reduce post-harvest losses of food fish and increase the value of the fish produced.

3.5 The study has identified five major areas of investment. These include three production-oriented programs -- improving product quality, fisheries management, and institutional strengthening. The investment costs of these programs total about \$90 million and are summarized in Table 13. The programs appear in Table 13 in the order of priority established by the Government. The time frame for the investment programs is from the present to the end of 1996.

3.6 Table 13 presents an outline of the proposed investment program, including indicative estimates of the scope, cost, and economic justification for each program. The institutional framework within which these programs are to be implemented is broadly defined. Further work is required to prepare detailed feasibility studies and appraisals of individual components of these programs.

Fisheries Management and Monitoring, Control and Surveillance

Fisheries Management

1. Almost universally fisheries management regulations generate controversy, discord and disagreement. However, many fisheries participants face the alternative of reaching agreement on management structure or going out of business.

Policy Options for Management

2. There are four means of controlling access to fisheries resources. They are:

- a. *A license.* This attempts to control effort and is easy to administer and understand. It does not always control the catch because it may not specify all the technological options open to the license holder.
- b. *A quota.* This attempts to control the catch and is difficult to administer and enforce since there are usually many places where catch may be landed and many ways to subvert the quota limit.
- c. *A tax.* This attempts to achieve an economically efficient system by transferring economic rents from the fishery to the government (see Appendix 1). In practice, determining the level of tax is difficult, and ensuring accurate reporting is seldom feasible.
- d. *A territorial use right.* This grants a type of tenure to a specific area. The grantee has the responsibility to maximize the net revenues obtained and would reasonably be expected to manage the area for the long-term benefits to be derived. Such a method, however, is confined to easily delimited areas such as artificial habitat deployment—a relatively tiny percentage of the marine aquatic environment.

3. Some combination of options and the institution of an effective FMR can, with the use of observers, log books, spot checks, and user participation, act to regulate effort and catch. Ideally such a regime could make the overall fishery more profitable for the participants and ensure the return to government of a fair share of the revenue generated.

Allocation

4. Setting up a system of allocating fishing effort once the level of effort is determined is not easy and it must be done with the cooperation of the fishing industry. Various options are available for setting up allocation systems and Mauritania should make every effort to secure the best advice possible. A study of the various allocation mechanisms including the requirements for and feasibility of, an international auction system for determining fishing rights, by species, by area, within the framework of an FMR, and with carefully designed criteria. (Such auctions are in use in other natural resource management areas, such as minerals and petroleum.)

Fisheries Management Regime (FMR)

5. The most satisfactory situation would employ the full panoply of measures which could be made available under an FMR. Particular note should be taken of the benefit brought to fisheries management by a special judicial system.

6. The following example of a tested management structure may be useful as a model for Mauritania. Experience gained over the past twenty years, notably in Iceland, has led to the concept of the Fisheries Management Regime (FMR). This refers to an overall institutional framework within which the fisheries operate. It may be austere or complicated. It may embrace one or many institutes, ministries, agencies or bureaus, but it must embrace all institutions related to the fisheries. The regime consists of three elements:

A Fisheries Management System (FMS), that sets out rules for conducting fishing;

A Monitoring, Control and Surveillance (MCS) System, that monitors fishing activities and enforces fishing rules; and

A Fisheries Judicial System (FJS), that complements the MCS and ensures adherence to the overall management system.

7. The components of the FMR are strongly interdependent. For example, the fishing rules specified by the FMS define the scope of MCS activity as well as the focus of the FJS. The operations of the MCS activity place demands on the FJS; both activities suggest any needed changes in the FMS.

8. Each component is crucial for the success of the FMR. To obtain full economic benefits, all three components must be appropriately designed, well coordinated and highly functional. For most circumstances a single entity should oversee the FMR as a whole and coordinate its components. Without this guidance the social and economic benefits of such a system could easily be dissipated.

9. Any such system must be designed with the needs, aspirations, and cultural, social and political framework of the country in the forefront of the design.

10. We are mindful of earlier attempts of the Mauritians to place one agency in control of the fisheries sector, with apparently strong political opposition to such measures. Perhaps a more consultative approach to define the vital interests of the various parties involved could reach consensus on the way in which fisheries management should be carried out.

11. Because Mauritania has a MCS in place it seems appropriate to comment on this aspect of a FMR in greater detail. It is assumed that to be effective in managing the fisheries stocks of Mauritania a fully featured FMR would be adopted and deployed in a reasonable time.

Fisheries Monitoring, Control, and Surveillance

12. Fisheries monitoring, surveillance and control together ensure compliance with relevant regulations.

13. Such regulations usually comprise rules on:

- access to the fisheries (permits, licenses);
- catch quotas (not introduced in Mauritania);
- manning of fishing vessels;
- fishing zones and seasons;
- requirements for fishing gear (mesh size);
- minimum weights and sizes of fish caught;
- submission of information on the fishing activity of vessels (catch and landing logs); and
- landing and transshipment requirements.

14. Both the Government and the private-sector operators acknowledge that illegal fishing is carried on, particularly in the central and southern zones. Irregularities occur even in authorized fishing, such as transfers between vessels on the high seas and false declarations regarding quantities of species caught and landed. Maintaining an efficient and cost-effective control and surveillance system is an absolute priority

15. Control and surveillance costs depend on whether the regulations imposed are based on the issuing of licenses or the imposition of export taxes. The licensing system is less costly and more straightforward, and is the one regularly applied to specialized fishing (for tuna, prawns, crayfish, and hake). Nevertheless, the strategy adopted in the new fisheries policy is to establish semi-public companies and impose export taxes on the most important types of catch, such as the small pelagic species and the demersal species (cephalopods and bottom fish). Such a strategy calls for more complex controls.

16. Mauritania has a very long coastline (700 km) over which to exercise surveillance, and only one port at the northern end (Nouadhibou) to act as a base for the Navy's patrol and surveillance vessels. Operating funds, particularly for diesel fuel, are very limited, and as a result surveillance is inadequate.

17. Mauritania's control and surveillance strategy must be based on the recommendations of CNROP and on current legislation, and must focus on those zones providing the most profitable catches for export; control and surveillance must be concentrated on the coastal breeding grounds reserved for artisanal fishing and on the zones in which freezer and wet-fish vessels fish for demersal species.

18. The system's control and surveillance activities must be clearly defined, and its sanctions must be seen to be imposed (for example, the arrest of crews and payment of fines, with subsequent publicity). The inspection methods used must be consistent with the very high fines, so that ships' masters and owners will realize that illegal fishing and breaches of the regulations bring them no profit. For large pelagic ships (Atlantic and super-Atlantic), the emphasis should be on improving the technical expertise of the on-board Mauritanian inspectors. A number of the fishing and processing operations carried out by these vessels have to be monitored as they are performed. This applies to mesh size, species caught, and the amounts and weights of units (cases or other forms) produced daily. Until now, the efficiency of Mauritanian inspectors on these large vessels has been low, because of inadequate technical training and communication difficulties. An intensive training program for inspectors --

provided, for example, by CNROP -- should be introduced.

19. Much progress has been achieved in making surveillance and control instrumental in implementing and informing fisheries policy. Such activities are no longer independently located in the military realm, with random results being presented to the fisheries administration. A recent inter-ministerial decree strengthened the Fisheries Control Department (DCP) as the initiating and coordinating body for all surveillance and control activities.

Development of Fisheries Surveillance and Control in Mauritania

20. The present system was established with the assistance and at the insistence of donor countries. The Government has been led to increase its regular budgeting of surveillance and control activities substantially. This has contributed to being able to ascertain the cost of flying hours and the cost of all local expenses for the Ministry's patrol vessel. A good portion of the funds needed to run the Navy's fast patrol boats now comes out of a regular budget.

21. Monitoring, fisheries surveillance and control in Mauritania is as much concerned with chasing so-called pirates (vessels fishing without authorization), as is a police force chasing bank robbers. While such an activity is its more spectacular aspect, that is certainly not the primary objective. From a resource management viewpoint, the presence of a few pirates might be considered less disturbing than a constant infringement of regulations by authorized vessels, particularly if this pertains to fishing gear and zones.

22. Obtaining compliance with regulations and the submission of catch information must be considered the most important aspect of fisheries monitoring, surveillance and control, as compliance ensures not the availability and the accuracy of data. It can serve as a basis for decisions on the management of a fisheries sector and, in particular, on the conditions of access to the resource (number of authorizations, cost of licenses).

23. Before the creation of the Fisheries Control Department (DCP) in 1988, a concerted, coordinated, and civilian approach to fisheries surveillance and control did not exist. The National Navy patrolled the waters, with no brief from the ministry in charge of fisheries. Fisheries monitoring, control and surveillance were not considered instruments for informing and implementing fisheries policy. Being limited by a lack of funds to cover operating costs, the Navy carried out only sporadic patrols. Yet some build-up of patrolling activities can be discerned. According to a government report (Note on Fishing Surveillance Strategy, October 1988), the Navy logged 111 days at sea in 1984, 159 in 1985, 240 in 1986, and 277 in 1987.

24. The Navy depended (and still does) on fast boats not suited to extended patrolling. Two airplanes equipped for aerial fisheries surveillance and control were purchased early by the Government with funds derived from fishing fines. However, these were put to use only minimally. The same government report indicates that in 1984 and 1986, not a single flying hour was recorded for fisheries surveillance and control, and only 10 and 20 flying hours were logged in 1985 and 1987, respectively. No system for the collection of data on catches existed until 1990.

25. Following recommendations contained in studies carried out by Crown Agents in 1985/86 with funding from the Kuwait and Arab Fund and the World Bank, the Government included a new department for fisheries surveillance and control in the structure of the Ministry of Fisheries and Marine Economy: the Fisheries Control Department (DCP), which became operational in 1988.

26. One condition for the structural adjustment credits provided to the Mauritanian Government in 1988/89 by the World Bank, was the implementation of a fisheries surveillance and control project comprising, as an essential element, a fisheries surveillance vessel capable of carrying out extended patrol duty.

27. With the assistance of the Federal Republic of Germany, a suitable vessel was acquired in July 1989. It was initially chartered for 18 months (GTZ funds) and then purchased for the Government through a financial contribution made available by the Kreditanstalt für Wiederaufbau (KFW).

28. The pilot technical assistance project under which the vessel, the N'Madi, was initially chartered was continued into a main phase of three years' duration (January 1991 to December 1993). KFW's contribution, totalling DM8.1 million, covered the purchase of spare parts, repairs abroad, and additional investments on the vessel for 1991-95.

29. The technical assistance project funded by GTZ also provided for a complete overhaul of the two surveillance aircraft. The first was returned after a total overhaul in February 1990; the second in September 1991. Communications equipment was installed at the DCP, and the introduction of a fishing log-book system was made possible.

30. There are at present six GTZ experts in Mauritania: a team leader, a data-processing specialist, an expert in fisheries control working on shore as well as on board, a nautical advisor and two mechanics on board the N'Madi.

31. Through the GTZ project, it has been possible to program a comprehensive databank system at DCP, which records all information on control activities and processes infringements and data from the catch logs. This databank is part of a centralized computer-based fisheries statistical system being developed by the DCP and the CNROP -- all data processed by either the Ministry of Fisheries and Marine Economy, the DCP, the CNROP, or any other institution (in future, for instance, the computer network being installed by the Navy will carry the same codes) could be transferred and used by all participants in the system.

32. Other donors have provided funding. The World Bank has financed the furnishing of the DCP offices, the installation of a core of computer hardware, and the training of personnel. French funding secured the overhaul of two naval vessels in 1989 and the purchase of spare parts for the existing patrol boats. A group of French Navy technicians assist the Navy workshops in Nouadhibou, to the benefit of the naval vessels and the N'Madi.

Results of Fisheries, Control and Surveillance

33. Since 1988, the effort put into fisheries surveillance and control has been considerably increased. In 1988, the Navy reported 365 days at sea and has maintained a level of 300-350 days at sea per annum since then. To this must be added the days spent at sea by the vessel of the Ministry of Fisheries and Marine Economy; the N'Madi was on patrol for 111 days during July-December 1989 and 196 days in 1990. Flying hours for surveillance and control totalled 495 in 1988 and more than 600 each year since.

34.

<u>Year</u>	<u>Days at Sea</u>	<u>Flying Hours</u>
1984	111	0
1985	159	10
1986	240	0
1987	277	20
1988	365	495
1989	411	600
1990	496	650

35. While exact information is available on the N'Madi's days at sea and a good check can be made on the number of Air Force flying hours for fishing surveillance, there is no system for checking the data for such activities by the Navy. Overall figures on days at sea must therefore be considered as estimates.

36. In the period, July 1989 to July 1991, a total of 896 violations were recorded as follows:

<u>Supervision Agent</u>	<u>Number</u>
N'Madi	453
Maritime Brigade	122
Coast Guard	200
Fisheries Control Dept	1
Air Force	120

37. If it is assumed that the level of violations recorded by the Maritime Brigade has remained the same over the years and that those registered by the Navy is proportionate to the number of sea-days performed, then it could be deduced that the number of recorded violations has tripled since 1984.

38. Over the same two-year period, the total amount charged in fines, according to information available on the computer database, was UM259 million. Figures on fines paid have not yet been entered into the database, but it appears that the amount outstanding is about UM150 million, a part of which is deemed unrecoverable because, for instance, the vessel-owner has gone bankrupt, or the vessel has left Mauritanian waters.

39. More recent data indicate that by April 1992 a total of 1340 violations had been reported by the DCP. The total amount of fines assessed was UM449 million of which about UM210 million were outstanding.

Compliance

40. The level of compliance with Mauritanian fisheries regulations cannot be quantified, as no objective indicator exists.

41. The N'Madi patrols only during the daytime, for an average of perhaps up to 20 days per month, while the Navy patrols less than 300 x 24 hours annually, and identification of infringements from available aircraft is possible only during the daytime for periods of 3-4 hours at a time. Considering that fishing is a 24-hour activity, perhaps only 20-30 percent of all violations committed are observed and reported. This number is high compared with what obtains in European fisheries; one may conclude that the level of compliance with Mauritanian fisheries regulations is too low.

42. But it is clear that the level of compliance would be even lower without the surveillance and control efforts. For certain offenses, such as fishing in closed areas, compliance has improved. In one instance -- the use of gill-nets by foreign vessels for lobster fishing -- progress has been achieved through fisheries surveillance and control.

43. In certain specific areas, the level of compliance can be indicated more precisely:

Not more than 20 percent of vessels bearing the national flag possess radio license, in observance of national and ITU regulations;

No single vessel bearing the national flag conforms to the legislation on the marking of fishing vessels;

Introduction of the requirement to maintain a catch-log has been surprisingly successful, certainly because of control and enforcement measures. There are great difficulties, however, in obtaining compliance, particularly by the national fleet, with the requirement to maintain a landing-log;

As far as concerns foreign vessels, the level of compliance with rules and newly introduced measures, such as catch-log and landing-log requirements, is high within the chartered pelagic fleet, but there are great difficulties with the EEC fleet. This is because the Government failed to negotiate inclusion of the requirement to comply with its own rules and regulations in its fisheries agreement with the EEC (in the absence of such a fisheries agreement, EEC vessels would have been compelled -- by EEC regulations -- to comply with Mauritanian catch-log regulations).

Procedures for Treating Reported Violations

44. Violations are dealt with by the Consultative Inspection Board (CCA), which submits proposals to the Minister of Fisheries and Marine Economy on fines to be charged, or recommends waivers. Only if a fine is contested by a vessel-owner would the case be handed over to the public prosecutor. There is no fisheries jurisprudence in Mauritania. This lack of interpretation and legal commentary on the application of the legislation is a deterrent to the development of the fisheries surveillance and control system.

45. The CCA is known to handle similar cases quite differently and deal with several offenses by one vessel separately or as a package. A backlog of reported violations is pending consideration by the CCA.

46. Some progress has been made, since minor offenses can now be dealt with immediately in Nouadhibou, and the CCA has become a permanent body.

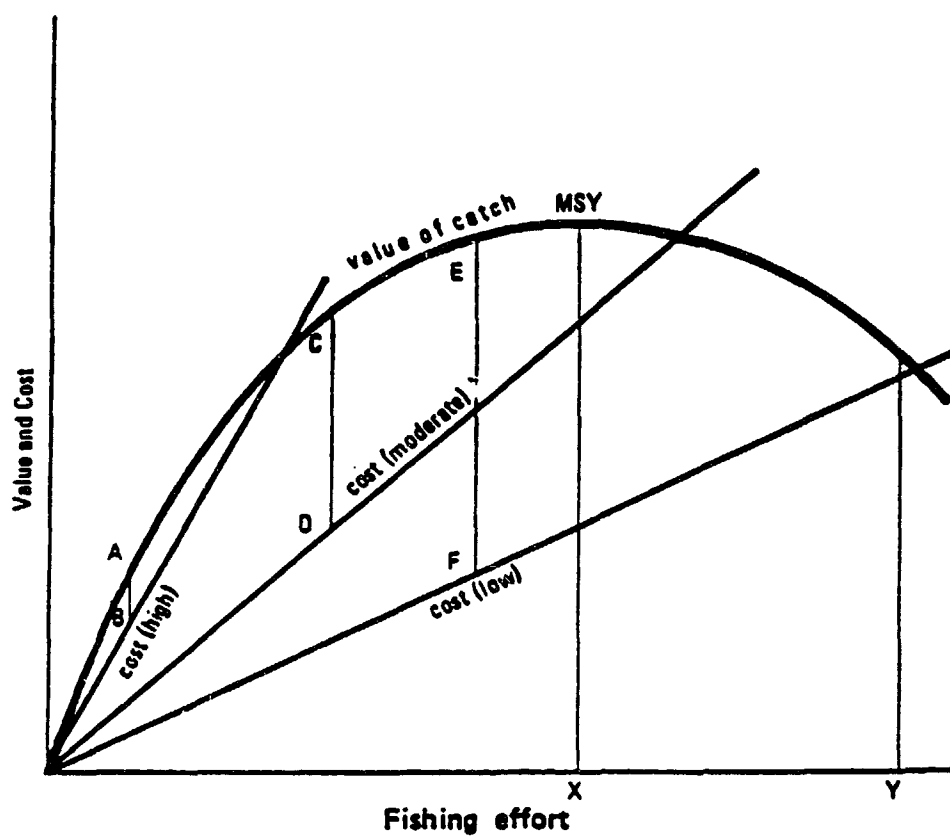
47. However, there is a need to clarify the CCA's part in the development of fisheries legislation or, alternatively, to establish an administrative mechanism for constant review of the legislation to ensure that it is an effective tool for managing the sector.

Fisheries Bio-Economics in the Mauritanian Context

Fishing Yields as a Function of Effort

Definition of Yields in Fisheries

1. The definitions accorded to various types of fisheries yields should be clearly understood, as economic and socially important decisions are based upon these terms.
2. When exploitation of a particular type of fish starts, yields rise rapidly and in proportion to the amount of fishing effort. However, the relationship between the catch (expressed here in terms of value) and fishing effort is a parabola which reaches a maximum and then starts to decline. This maximum is usually reached at moderate levels of fishing effort and is referred to as the maximum sustainable yield (MSY).
3. The maximum economic yield (MEY) is generated by reducing fishing effort to a point where the difference between the value of the catch and the cost of harvesting is maximized. The amount of fishing effort required to generate the MEY is entirely dependent upon the cost of harvesting.
4. In the example shown, maximum economic yields, a, c and e which generate the greatest profits (ab, cd and ef) are always less than the MSY, and if costs of production are high, it might be impossible to even approach the MSY and still obtain a profit. If operating costs are low, it is possible to increase effort far beyond that producing the MSY but still make a profit. Many heavily exploited fisheries operate at effort level Y which ensures minimal profits and sub-optimal production.
5. The optimum sustainable yield (OSY) is a compromise between MSY and MEY, which might, for example, aim to maximize employment while still affording a reasonable profit and producing a substantial catch.
6. In fisheries which simultaneously exploit many different interacting species of fish, the yield curve might be of quite an irregular shape and the yield curve for value (Y_v) might differ markedly from the yield curve for weight (Y_w) and have a different maximum.
7. For some multi-species fisheries, no clear MSY is apparent, and the catch (in weight) does not decline in response to very heavy fishing effort. This is thought to be a result of the removal of large, slow growing predatory species and consequently increased survival of small rapidly-growing species. The total catch must eventually decline at extremely high levels of effort, but for practical purposes the yield curve can be described as asymptotic. The yield in value (Y_v) curve in such cases declines more rapidly than the yield in weight (Y_w).

VALUE OF THE CATCH AND COST OF
HARVESTING

Modern Fisheries Economics

8. Modern fisheries economics state that a fisheries resource can be considered as capital in which investment can take place or which can be used up, in exactly the same way as investment can take place in machinery for manufacturing and be used up by wear and tear. The owner of a fisheries resource invests in the resource by abstaining from fishing, or restricting access to it. The resource is allowed to grow and generate a future flow of benefits. The owner of a fisheries resource disinvests by running down the fish stock through fishing. The economic problem is to find the optimal balance between using the fish stock by fishing and investing in the fish stock by restricting fishing operations^{1/}. For a country which owns a fish resource, optimal use requires thinking of it as part of the national capital, to be used in the best possible way, through a mix of catching and selling and conservation.

9. The discount rate is important to the theory as well as to the practical implications. The discount rate makes the difference, according to the analysis made by Gilly and Maucorps^{2/}. In general, the effect of discounting is to support a higher catch in the present, although not generally beyond the maximum sustainable yield. This occurs because the value of the catch in the present is increased in proportion to the value of future catches.

Implications

10. On one hand, the natural resource is valuable; on the other hand, under conditions of open access, the resource is unpriced. To the extent that the resource is unpriced, invariably there is economic over-fishing, in the sense that the flow of benefits in the form of resource income is less than it might be. This also translates into biological over-fishing.

11. There is no alternative but some form of fisheries management. The many different ways of managing fisheries can be divided broadly into two: biological and economic. The former -- such as control by quota, closed seasons for fishing, or closed areas -- address the consequences of over-fishing. The latter, such as a levy on sales or a licensing system, address the causes of over-fishing.

12. Some countries have introduced successful fisheries management systems, notably Australia and New Zealand. A major difficulty is that the more successful the system, the greater the profitability of fishing vessels, and thus the greater the temptation to break the system of management.

1/ As with most economic results, the optimal balance between fishing ("disinvestment") and conservation ("investment") can be expressed as marginal costs and benefits. It arises when the gains from fishing in the present are, marginally, just equal to the costs, again marginally, expressed in terms of the resulting loss of fishing in the future.

2/ Gilly B. and Maucorps A. "Eléments pour l'aménagement des principales pêcheries de la République Islamique de Mauritanie et pour le développement de la recherche halieutique." Provisional version, May 1987. Their model estimates that the maximum income from cephalopod fisheries would be obtained with a fleet of about 20 efficient freezer-trawlers. A more dynamic analysis with more built-in constraints and factors (such as a positive real discount rate, lost time for repairs, the need to mauritanize crews, port congestion, handling and processing problems, the role of the artisanal fleet) might generate different results.

13. This will be true for Mauritania. It will take time to develop convincing bioeconomic models. The circumstances of the country imply that the simplifying assumptions of Gilly and Maucorps cannot match a biological and economic reality which is evolving over time and is highly complex. However, the principle that the optimal level of fishing effort will be less than the free market level cannot be challenged. The Government must take a view on the appropriate number of vessels allowable for each species although remaining prepared to adapt over time. To the extent that fisheries controls are successful (and thus that vessels become more profitable) the pressure to break the controls will increase.

Information Requirements

14. The three basic components of bioeconomic models are dynamic biological models of the fisheries resources, cost and earning information, including the costs of the processing sector and other onshore activities, and the discount rate. The biological models are necessarily difficult to obtain, and require frequent updating. Cost and earnings information is difficult to obtain, often because of commercial secrecy. Nevertheless, the effort is worthwhile because the results take the Government beyond the application of fisheries management decisions based on biological criteria alone.

FISHERIES INSTITUTIONS

1. The most important government agency dealing with the fisheries sector, is the Ministry of Fisheries and Marine Economy, which has overall responsibility for the sector. Other key fisheries institutions are:

Centre National de la Recherche Océanographique et des Pêches (CNROP)	National fisheries research and management
Direction de la Pêche Industrielle	Policy advice, information collection, fisheries development
Société Mauritanienne pour la Commercialisation du Poisson (SMCP)	State monopoly of fish exportation
Société pour la Promotion de la Pêche Artisanale (SPPAM)	Promotion of artisanal fisheries
Direction de la Commande de Pêche (DCP)	Fisheries surveillance
L'Ecole Nationale d'Enseignement Maritime et de la Pêche (ENEMP)	Training
Collège d'Enseignement Technique Mamadou Touré	Training
L'Institut Supérieur des Sciences et Techniques Halieutiques (ISSTH)	Training
Ministry of Planning	Policy Advice
Ministry of Finance	Policy Advice
Central Bank	Policy Advice
Commercial and Development Bank	Financing of fishing activities
National Navy, National Air Force, Customs Department, and Police Force	Support to fishing surveillance and control
Port de l'Amitié and Port of Nouadhibou	Fisheries infrastructure, facilities for loading and unloading

2. Some additional notes on specialized fisheries institutions follow.

The Company for the Promotion of Artisanal Fisheries in Mauritania (SPPAM)

3. The SPPAM was established in 1983 as an incorporated company. Fifty-five percent of its capital is privately owned, 35 percent is owned by the Government, and 10 percent is owned by the cooperative sector.
4. Its main objective is the promotion of artisanal fisheries. It is responsible for importing fishing gear, as well as for repairs to vessels and equipment. As a ship-handler, it enjoys some tax relief.
5. SPPAM was established within the framework of a project supported by DANIDA. The SPPAM now owns various facilities; capacities are shown in Table 1.

Table 1: Capacity of Freezing and Cold-Storage Facilities Owned by SPPAM

<u>Location</u>	<u>Ice</u>	<u>Insulated boxes</u>	<u>Chill</u>	<u>Freezing</u>	<u>Storage</u>
Nouakchott*	40t/d		150t	16t/d	800t
Kaedi	10t/d				50t
Rosso	5t/d				25t
Bogue	5t/d				25t
Kiffa	5t/d				25t
PK 65		10t			
PK 28		10t			
Belawakh		10t			
Lemcid		10t			
Tiwilitt		10t			

* Five refrigerated vehicles, 10 insulated vehicles, spare parts, and sundry equipment.

Source: MPEM

6. This equipment was initially on loan from the Danish Government, and has now been converted into a gift. Its value appears in the accounts of the SPPAM as a loan, denominated in Danish Kroner (11,934,854) and converted into UM (146,464,399.94, now UM154,556,080.78).

7. The generally worsening picture of operating losses over several years, apart from on the Danish project, should be noted. The last year when the SPPAM made a profit before depreciation was 1987. In the three subsequent years, value-added was not sufficient to cover wages and salaries, as may be seen in Table 2.

Table 2: SPPAM Comparative Results (Ouguiyas)

	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
Sales of fish & eqpt	127,710,122	98,906,166	70,616,532	66,900,548
Less:				
Intermediate goods & services	89,887,461	88,187,276	63,075,578	54,918,981
Value added	37,822,661	10,718,890	7,540,954	11,981,567
Wages & salaries	17,211,436	16,745,819	13,942,478	17,265,426
Less:				
Other expenses & transfers (net)	64,182	(3,784,862)	5,427,450	3,710,857
Profit before depreciation & interest	20,547,043	-2,242,067	-11,826,974	-8,994,716

Source: 1990 Profit and Loss Account, SPPAM

8. In 1990, the recurring losses of this company become disproportionate as a result of a depreciation charge of UM97,743,826.

9. There is total disorder in accounting procedures, complete absence of legal journals, and no rational system for the organization of inventory.

Selected Tables **Mauritania Fisheries Sector Survey** **1991**

EC Agreement -- Three years (1990-93)

1. Use of fishing opportunities under the EC agreement are shown in Tables 1 and 2.

Table 1

Use of Opportunities To Fish in the Context of the EEC/Mauritania Fisheries Agreement:
During First Year of Implementation, August 1, 1990 to July 31, 1991

<u>Category of catch/vessel</u>	<u>Quota</u>	<u>Total Quota Use</u> (GRT)	<u>No. of Vessels</u>	<u>Use by Member State</u> (GRT)	<u>No. of Vessels</u>	<u>Transfer Value</u> (ECU)
	(GRT)					
Crayfish		1,300.56	9	P 1,300.56	P 9	314,735
	1,950					
Shrimp		7,975.40	39	E 7,975.40	E 39	2,201,210
	10,000					
Black hake		9,670.02	30	E 9,342.51	E 28	1,373,142
	15,000			P 327.51	P 2	
Pelagic species (Net & trawler)		2,046.12	13	P 2,046.12	P 13	225,073
	9,000					
Tuna		4,092.25	20	F 3,587.36	F 16	
Canner				E 504.89	E 4	54,000
Surface net-line	38 boats	1,066.79	7	E 1,066.79	E 7	25,000
Tuna		22,226.46	25	E 14,701.17	E 16	100,000
Net	25 boats			F 7,524.29	F 9	
Freezer						
						9,250,000
EEC Contribution						
						13,543,160
GRAND TOTAL 1990						

Table 2

Use of Opportunities To Fish in the Context of the EEC/Mauritania Fisheries Agreement:
During Second Year of Implementation, August 1, 1991 to July 31, 1992

<u>Category of catch/vessel</u>	<u>Quota</u> (GRT)	<u>Total Quota Use</u> (GRT)	<u>No. of Vessels</u>	<u>Use by Member State</u> (GRT)	<u>No. of Vessels</u>	<u>Transfer Value</u> (ECU)
Crayfish	1,950	---	-	P	---	---
Shrimp	10,000	5,370.14	27	E	5,310.14	E E 1,465,600
Black hake	15,000	8,610.19	27	E P	8,610.19 ---	E 27 -- 1,222,646
Pelagic species (Net & trawler)	9,000	121.61	1	P	121.61	P 1 13,377
Tuna		2,331.36	11	F	1,970.18	F 8
Canner	38 boats			E	361.18	E 3 26,000
Surface net-line		286.83	2	E	286.83	E 2
Tuna	25 boats	25,262.62	25	E	17,771.19	E 16 25,000
Net				F	7,491.43	F 9
Freezer						
EEC Contribution						9,250,000
GRAND TOTAL 1991						12,002,620

Table 3

Scale of Payments for Licenses to Fish in Mauritanian Waters

(a) EC Compensation

Financial	ECU27,750,000 (in 3 annual p a)
Scientific research	ECU900,000
Training	ECU360,000

(b) EC vessel-owners

Vessels fishing for crustaceans other than lobster	ECU276/GRT/year
Hake trawlers and long liners	ECU142/GRT/year
Net and pelagic trawlers	ECU110/GRT/year
Lobster trawlers	ECU242/GRT/year
Tuna trawlers	ECU20/GRT/year

(c) Chartered Vessels for Pelagic Fishing

Share of value of the production	30 percent (minimum guaranteed) for charterer 70 percent for owner
Operating costs to be met by the owner	
Mauritanian personnel costs and taxes to be met by the charterer	
35 percent of the crew to be Mauritanian	

(d) Chartered Vessels for Demersal Fishing

Same as for pelagic fishing vessels, except:	35 percent for charterer 65 percent for owner
--	--

Supplies to be taken in, if possible, in Mauritania

National Fleet

Export duty plus IMF 2 percent
 Indirect taxes (difficult to evaluate, but substantial enough to be taken into account)
 40 percent tax on profits

Export Taxes

2. Export taxes, plus other charges deducted by the SMCP when it credits the vessel-owner with the value of fish (rates for fresh fish are indicated), are shown in Table 4.

Table 4**Export Taxes on Fish (percentages)**

<u>Item</u>	<u>Frozen at sea</u>	<u>Frozen on shore</u>	<u>Fresh</u>
Customs duties			
Cephalopods	11.0	6.0	8.0
Noble demersals	8.0	3.0	7.0
Other demersals	8.0	2.0	7.0
Pelagics (from national boats)	2.0		
Pelagics (from foreign boats)			
Shrimp, Lobster	13.5		
Poutargue	5.0		
Fish flour	5.0		
Fish oil	14.5		
	14.5		
Statistics tax			
IMF	0.1		
Municipal tax	2.0		
Port tax	UM20/kg		
Service tax on port tax	UM210/tonne		
	16.0		

Source: SMCP

3. There is no obvious case for charging differential rates of duty for the same species. The rate of export duty should correspond to the capacity of the resource to yield a resource rent when fishing and processing take place in the most efficient manner. A differential rate represents a subsidy to the beneficiary of the lower rate – in this case, the catchers and processors of fish frozen at sea.

Notes on Privatization in the Fisheries Industry

1. Privatization in the fisheries industry must be approached with extreme care. Experience of offering advice to potential private-sector owners or part-owners in Latin America and Eastern Europe suggests several potential pitfalls. These may be summarized:

Fishing is a high-risk business and major shareholders should have a good understanding of it. It may not be easy to find suitable persons;

Reaching agreement among competing interests on the appointment of suitably qualified and competent directors and company officers may be difficult. The interests of the business should be paramount;

Similar problems may arise at the managerial level. The directors must be energetic in their search for suitably qualified persons to manage business efficiently;

It may be difficult to agree with the Government on the value of the assets. Assets are worth only the net current value of the stream of benefits expected to flow from them if they are used efficiently, whatever their initial cost price;

Raising loan capital may prove difficult. It is a useful discipline for management to produce a first-class management plan which explains, both qualitatively and quantitatively, how the company is going to perform over a number of years;

Properly structured reward systems should be in place for the crews. This must involve some incentive arrangement;

For efficient operations, redundancies at both staff and shop-floor levels are almost inevitable;

There is no reason to assume that the physical assets bound up in the joint ventures, as they are currently constituted, represent the best allocation of those assets. It may be desirable to break them up.

Table 13: Fisheries Sector Investment Program, 1992-96

Reference	Project Title	Duration	Exec. Agency	Funding Source	Fndg Type	Fndg Phase	1992 Program	1993 Program	1994 Program	1995 Program	1996 Program
21G006BE	Fisheries surveillance and control	89-96	DCP	KFW GVT GTZ Total	DON BUDG DON	5	0.00 250.00 90.00 340.00	68.00 250.00 125.00 443.00	68.00 250.00 0.00 318.00	68.00 250.00 0.00 318.00	0.00 250.00 0.00 250.00
21G020BE	Assistance for fisheries export	89-92	MCAT	UNCTAD-GATT	DON	5	16.00	0.00	0.00	0.00	0.00
21I004BE	Baie de Repos development	88-94	DPA	FADES GVT Total	LOAN BUDG	5	228.00 22.00 250.00	228.00 22.00 250.00	337.00 22.00 359.00	0.00 0.00 0.00	0.00 0.00 0.00
21I019BA	Port renovation and development	92-94	PAN	CCCE	DON	5	475.00	555.00	200.00	0.00	0.00
21P010BE	Artisanal fisheries dvpt in the South	90-94	DPA	GVT FAD Total	BUDG QDON	5	19.00 190.00 209.00	6.97 117.97 124.94	0.00 100.00 100.00	0.00 0.00 0.00	0.00 0.00 0.00
21P024BE	Artis. fisheries promotion	92-93	DPA	FED	DON	5	20.00	60.00	0.00	0.00	0.00
21S005BA	CFFM Nouadhibou	90-94	DFPM	GVT IDA FAD Total	BUDG QDON QDON	5	17.00 33.00 136.00 186.00	17.00 0.00 149.00 166.00	17.00 0.00 23.00 40.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
21S008BA	Fisheries research	91-95	CNROP/ MPEM	FAC GVT CCCE Total	DON BUDG DON	5	29.00 56.00 0.00 85.00	5.00 56.00 45.00 106.00	0.00 56.00 45.00 101.00	0.00 56.00 0.00 56.00	0.00 0.00 0.00 0.00
21P025BE	Imraguen Dvpt, Arguin Bank	94-98	PNBA	FIDA	DON	4	0.00	0.00	68.00	68.00	68.00
21P020BE	Dry-dock infrastructure	94-99	DMM	CCCE/ FADES	DON	3	0.00	0.00	200.00	400.00	600.00
21E003BE	Pelagic fishing study	95-96	CEAMP	CCCE	DON	2	0.00	0.00	0.00	8.00	5.00
21I017BE	Maritime signalling	95-97	DMM	CCCE	DON	2	0.00	0.00	0.00	50.00	114.00
21P018BE	Nouak. artisanal fisheries wharf	95-96	DPA	RESRCH	DON	2	0.00	0.00	0.00	250.00	150.00
21P022BE	Artisan. fisheries dvpt in the North	95-97	DPA	JAPAN	DON	2	0.00	0.00	0.00	60.0	160.00
Total 21-FISHERIES No. prj.: 14			Total:				1581.00	1704.94	1386.00	1210.00	1347.00

MAURITANIA FISHERIES SECTOR REVIEW

- PAVED ROADS
- - - PAVED ROADS UNDER CONSTRUCTION
- GRAVEL ROADS
- - - TRACKS
- RAILROADS
- ⊙ NATIONAL CAPITAL
- INTERNATIONAL BOUNDARIES
- - - INDICATES THE TERRITORY OF THE FORMER SPANISH SAHARA (WESTERN SAHARA)

- ✈ AIRFIELDS
- ⚓ PORTS
- IRON ORE MINES

- ⊙ COPPER
- ⊙ IRON
- ⊙ DATE PALMS
- ⊙ FISHING
- ⊙ FISHING ZONES

AGRICULTURAL ZONES:

- SAHARAN DESERT
- - - SAHARAN SUB-DESERT
- SAHELIAN

MOROCCO

ALGERIA

 0 50 100 150 200 250
KILOMETERS
FORMER
SPANISH
SAHARAAtlantic
Ocean

MALI

Nouadhibou

Bir Mogrein

Guelbs
M'Haoudat
Zouérat
Kedla

Fderik

Ouadane

Atâr

Chinguetti

Akjouit

NOUAKCHOTT

Moudjéria

Tidjikja

Tichit

Boutilimit

Mederdra

Aleg

Bogué

Rosso

Kaedi

Mbout

Kiffa

Sélibabi

Tâmcheckett

Barena

Ayoûn el Atroûs

Timbedgha

Oualâta

NÉMA

SENEGAL

MALI

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